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THE IMPACT ON THE ENVIRONMENT OF SURFACE MINING IN ALBERTA

PROCEEDINGS
OF THE
PUBLIC HEARINGS

PART II

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DECEMBER, 1971
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ENVIRONMENT CONSERVATION
AUTHORITY
9912 - 107 STREET,
EDMONTON, ALBERTA

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THE IMPACT ON THE ENVIRONMENT OF SURFACE MINING IN ALBERTA

PUBLIC HEARINGS
AT
CALGARY

SOUTHERN ALBERTA JUBILEE
AUDITORIUM
DECEMBER 21, 1971

ENVIRONMENT CONSERVATION
AUTHORITY

4.1 SUBMISSION

Presented By

Mr. George Barnes

THE COAL ASSOCIATION OF CANADA

On Behalf of Its Alberta Members

to the

PUBLIC HEARINGS

Conducted By The

ENVIRONMENT CONSERVATION AUTHORITY

Jubilee Auditorium, Calgary, Alberta

Tuesday, December 21, 1971

I. PREFACE

Mister Chairman, members of the Authority, other groups and the public present, we welcome this opportunity to appear before you today. The Submission that we will be presenting is on behalf of the Alberta coal producers and those companies who are at meaningful stages of exploration prior to embarking on coal production. These companies represent all of the coal producers in Alberta with the exception of two small domestic coal operators and the production of our companies represents over 98% of the coal produced in Alberta. The names of the companies supporting this Submission are as follows:

Alberta Coal Ltd.
Canmore Mines, Limited
CanPac Minerals Ltd.
Cardinal River Coals Limited
Coleman Collieries Limited
Luscar Ltd.
McIntyre Coal Mines Ltd.
Scurry-Rainbow Oil Ltd.

Our companies and individuals within our companies recognize and are in accord with Government and public concern which is being expressed today with regard to ecological balance. This series of Hearings presently being conducted relates specifically to coal. We believe Hearings of this nature in regard to environment are desirable where activity other than mining may affect the environment so that the various factors can be put in their proper perspective.

As we mentioned we welcome this opportunity to present our thoughts and recommendations regarding preservation of the environment, particularly as it is related to both open cast and underground coal mining. It also provides an opportunity to counter the unfortunate impression created by certain ecologists that the coal industry is not concerned with the environment. Indeed we are! We are proud of this country and we are sincerely interested in evolving such practical guidelines as will best serve Canadians, safeguard the cleanliness of the air, the beauty of the land and the purity of the streams.

We submit that the first phase of the fight against pollution has been won. The ecologists have rendered a valuable service to society by alerting it to the dangers which were ahead if corrective action were not taken. However, in doing so, they have frequently exaggerated the negative and eliminated reference to many highly successful reclamation projects and costly pollution control mechanisms now in existence. As is often the case, such action has resulted in the pendulum swinging perhaps too far and we submit that it is the opportune time to bring it back closer to its proper place. We must now balance the understandable emotional desire for a completely undisturbed environment against the practical needs of an energy-hungry society which demands a low unemployment rate and a high standard of living.

II. RESERVES

First, briefly, with respect to reserves, the estimated reserves of all types of coal by provinces is shown on a table attached to this submission. In Alberta these total approximately 48 billion tons in place of which about one-half or approximately 24 billion tons may, with further exploration, be considered to be recoverable under existing mining techniques and production and transportation costs, etc. and immediately anticipated market demand and prices. This does not mean to infer that most of our coal reserves may not be some day utilized for future generations with improved mining techniques and possible gasification from coal.

It should be noted that a recent report published by the Geological Survey of Canada, Department of Energy, Mines and Resources, Ottawa, indicates that 93% of Canada'a total reserves can be developed only through underground mining methods which create a minimum of disturbance to the environment and that only 7% are amenable to open cast mining. This ratio would apply to Alberta's bituminous coals, although the sub-bituminous would tend more to open cast.

There is a currently popular misconception that coal development offers a highly profitable potential for developers. We submit that this is an illusion, and the present experience of current developers indicates as we will discuss later in this Submission, that the major revenue generated goes into the province and country in many forms, and indeed the coal company shareholder's return on his investment is at present nil or marginal and will hopefully in the future, with improved efficiency, be reasonable although certainly not excessive. In fact future coal development could be inhibited by this reality.

The emphasis on our open cast mining potential, at this point in time, is a matter of economics. The lower cost of open cast mining allows us now, in the light of today's prices and markets to respond to the energy demand of our citizens,and to create new jobs, generate new taxation revenue and to enhance the activity and development of our service and secondary industries, all of which contribute to the maintenance and improvement of our standard of living.

III. HISTORICAL BACKGROUND

The industry recognizes that some coal operations of the past have left unsightly scars on the landscape, mainly in the inner and outer Foothills Belt. Although most of these scars are in remote areas seldom seen by the public and were in all cases created many years ago, they have given coal a bad image. Nevertheless, the industry is not proud of these circumstances and is perhaps open to some censure regarding the behaviour and attitude of its predecessors. Present thermal coal producers are excluded from this comment since there is documented evidence of their efforts in land reclamation. However as late as even two or three years ago there was no public, government or industry recognition about such matters, nor about ecology in general. Most of today's most vocal critics were silent then. The coal industry then was not alone in this attitude to ecology - neither were other industries, various levels of government, etc. as evidenced by environmental damage created by many industries, and government, such as municipalities' disposal of raw sewage, etc.

It should be noted that those companies now engaged in coal production and who are likely to be involved in the development of coal in the future are large substantial companies with a real concern for the environment and corporate image, not only as this image relates to the companies' operating success but also in respect to a genuine concern by these companies, and individuals of responsibility within these companies, for the affect of their operations on the environment.

IV. OPERATING AND POTENTIAL MINES, AREAS AND DEVELOPMENT - 1971-1978

First with regard to export coking coal there are at present four operating mines in Alberta:

1.	Coleman Collieries Limited	1,500,000 T/A	approx.	20% Open Cast
2.	Canmore Mines, Limited	500,000 T/A	approx.	20% Open Cast
3.	Cardinal River Coals Limited	1,000,000 T/A		100% Open Cast
4.	McIntyre Coal Mines Ltd.	2,000,000 T/A		34% Open Cast

Thus on current commitments by 1972 we will be mining 5,000,000 tons per annum or a total of 70,000,000 tons over a 15 year contract period. The total value of these shipments is over $1,000,000,000.

Of signifiance to these Hearings is the reality that the coal industry in Alberta faces a far more competitive and difficult marketing challenge than is generally supposed. Present world prices for coking coal and competitive prices of competing forms of energy for electric power generation do not indicate automatic assurance of coal resource development.

Now what about the future, considering our comments regarding competition? It is possible that within the next 5 or 6 years, say by 1978, we may see 4 or possibly 5 additional large mines.

1 North of Coleman	perhaps	2,000,000 T/A
1 Highwood area (50 to 60 miles	railway)	2,000,000 T/A
1 Panther River area		2,000,000 T/A
1 Luscar area		1,000,000 T/A
1 North of Hinton		2,000,000 T/A
and Grande Cache - a potential for		3,000,000 T/A

This is a possible additional 12,000,000 tons per annum.

With regard to thermal coal the major mining companies in production are Alberta Coal Ltd. and Luscar Ltd.. Production in 1971 is expected to be in excess of 4.2 million tons. Mining activity is located in the Castor, Forestburg, Pembina (Wabamun) and Sheerness areas of Alberta. It is not inconceivable that tonnages over 7.5 million could be mined by 1975 or 1976 in Alberta. The utilities being served are primarily Calgary Power Ltd. and Canadian Utilities Ltd.

It should be noted in relation to thermal coal production that our cost of electric power in Alberta is one of the lowest in the world, due to the proximity to our power generating plants to this low cost source of energy - COAL. An increase in the cost of coal production due to unduly stringent and unnecessary restrictive legislative measures would be directly reflected in an upward revision of industrial and individual householder electric power rates.

V. ECONOMICS

Our export or coking and thermal coal mining operations which will be producing approximately 10 million tons per annum by 1972 are at present creating a total 2,500 jobs with a gross payroll of approximately $18 million per annum directly connected with the mining and processing operations and economists estimate that there will be an additional 5,000 jobs which are dependent on the industry in the areas of transportation, port loading, construction, supply and service industries, government employees, etc.

With respect to the potential new export or coking coal operations the following is significant. All of the new coking coal operations will require railway extensions of 5 to 50 miles at costs of $200,000 to $500,000 per mile; most of the revenue from which will be returned to Alberta. The direct cost of bringing new coking coal mines of this kind into production would be a minimum of $25 per annual ton; i.e. 1 million ton mine would cost $25 million; 2 million ton mine would cost $50 million, and mines smaller than 1 to 2 million tons would not be economic. We would emphasize that for economic reasons we need not be concerned about the possibility of smaller mine operations. The annual value of our potential coking coal production in Alberta (1971-78) could be over $300 million f.o.b. vessel.

Now what would all this add up to if these coking and thermal coal productions are realized by 1975-78? We would be producing 24.5 million tons per annum; 19.5 million open cast and 5 million underground. We should point out that this imbalance of open cast versus underground as mentioned under Reserves will be drastically reversed in the future if we are to continue development of this resource.

With respect to total Alberta coal production it will result in direct labour charges at the mine of $40 million or more with approximately 5,000 men employed at the mines, and a projected 10,000 jobs dependent on the industry.

We re-emphasize that of the vast potential revenues which might be created by all of these coal mining activities a nominal amount is expected to be returned to the shareholders of the companies and the rest of the revenue generated will be going into the economy of our province and our country into jobs and industries mentioned above and also in the form of taxation to all three levels of government, not only directly by the producing companies but through ancillary taxation including income and corporate taxation generated by jobs and revenue in these support industries and activities.

In summation on this section on Economics, we would like to refer you to a recent report of the Economic Council of Canada regarding the need for the creation of new jobs and work potential to alleviate our unemployment problem. We submit that the coal industry and its development, with the accompanying creation of new jobs, not only directly but indirectly, can be a significant contributing factor in relation to the resolution of our unemployment problem which is of such grave concern to all of us.

VI. ENVIRONMENTAL EFFECTS

With regard to environmental effects relative to coking or export coal it is possible there may be a total of say 8 or possibly 9 mines located at approximately 50 mile intervals along a 400 mile front of the Inner and Outer Foothills Belt. Each mine would occupy a maximum area of 2 1/2 square miles; i.e. about 20 to 25 square miles in total for all mines. This represents 1/6 of 1% of the 15,000 square miles Foothills Belt and about 1/20 of 1% of the total forest and green area of western Alberta which amounts to 46,000 square miles. These figures would appear to indicate that coal mining is not likely to decrease the recreational opportunities or diminish the game range to any appreciable extent.

Coal is comprised mainly of fixed carbon. This is an inert material, insoluble in water and its only toxic ingredient is Pyritic Sulphur. We are fortunate in that our Alberta coals are extremely low in Pyritic Sulphur, about 2/10's of 1%. This is about 1/10 of the Pyritic Sulphur content of the eastern United States and European coals which as a rule contain 2% or more.

We would like to quote from public comments made by Dr. N. Berkowitz, Head of the Fuel Sciences Division of the Research Council of Alberta and a recognized coal expert.

> "As a general rule a coal mine is only a source of pollution to the extent that it improperly discharges acid mine waters; i.e. effluents that form when Pyritic Sulphur associated with the coal is oxidized by air and the resultant sulphur oxides entrained to produce sulphurous/sulphuric acid mixtures. However unlike Eastern and most European coals which commonly contain two percent or more of Pyritic Sulphur, and which therefore often create serious problems through acid mine waters, western Canadian coals carry no more than about 0.2 ot 0.3% Pyritic Sulphur. The remainder of their analytically determined sulphur content is organically bound to carbon and not amenable to atmospheric conversion in SO_2 and SO_3. Except for isolated instances of abnormally high pyritic concentration, which have not yet actually been encountered, pollution from these sources is therefore likely to be insignificant.

> It is also worth observing that in open cast mines, where the coal body is exposed, and consequently able to equalibriate with the drier air, small accumulations of acid mine waters would, in any event, tend to be absorbed into the coal rather than to discharge from it."

Again quoting from the same source regarding mine water effluent

> "Despite some statements to the contrary, they [mine water effluents] are non-acidic, with pH values generally running near 6.7."

As a result the possibility of the discharge of acid waters into our mountain streams is extremely remote and in no case has it been demonstrated that coal mining in Alberta has yet diminished either the quality or the quantity of our water supply. Nor do we believe that there is any reason for this to occur in the future, with the regulatory and control measures which the industry advocates.

In short, since coal will occupy less than 1/20th of 1% of the forest and green area of Alberta and since stream pollution is unlikely, it is our conclusion that coal mining will not have material effect on wildlife and recreation in Alberta. It should be noted that disturbances created by coal exploration or mining activity are primarily temporary in nature. If we are prepared to accept other temporary disturbances, i.e. new highway constructio for their present and future benefit to society, surely a similar attitude toward the orderly development of our coal resources would seem reasonable.

The standards and practices of the past however need not be and should not be the standards of the future. The general public, including the coal industry, accept this philosophy.

With regard to water pollution at plant site the design of new modern preparation plants provides for closed circuit water cycles; in effect minimizing the possibility of preparation plant water pollution. In addition modern preparation plant design is such that the coal industry is now in a favorable position with regard to air pollution.

If we could again quote from a senior official of the Research Council of Alberta, some comments should be made concerning the mining of thermal coal.

> "For practical purposes [with regard to thermal coal] the real problem area presented by pollution thus narrows itself to physical pollution of air or water by discharged solids. As matters stand, such contamination still appears to be minimal. Visual observations at two sites - Forestburg's open cast mine on the Battle River in south-central Alberta, and Calgary Power's open cast mine on Lake Wabamun - suggest that neither mining nor haulage to the respective generating stations creates appreciably more dust than ordinary traffic over secondary roads. And there is, equally, no evidence that mining adversely affects the volume, flow or quality of the water bodies adjoining these sites."

VII. PRESENT REQUIREMENTS

Contrary to suggestions or uninformed presentations made at these Hearings up to this point in time, there is at present legislation and departmental authority regulating coal mining, exploration and development. All new operations both for mining and exploration must secure permits before any work can proceed. The applicant, in the case of a new venture, must submit plans and secure approvals from all Departments of Government concerned. These plans must show:

1) The area to be affected.
2) The location of all water courses, public roads and dwellings.
3) Plans for the disposal of non-merchantable timber, overburden, and other waste materials.
4) Plans for recontouring, replanting and reseeding of disturbed land.
5) Plans for the disposal of effluents from mine or preparation plants.
6) Plans for the control of dust emission from cleaning plants.

Companies engaged in exploration are required to back-fill all trenches and adits and to level and reseed all disturbed ground including access roads before these sites are abandoned.

In effect, the company, whether embarking on an exploration or development project, enters into an agreement with the Government to protect the environment before the exploration or project commences.

The industry commends the present Government in establishing a Cabinet Committee, composed of five Cabinet Ministers from the Departments involved to review and make recommendations on policy to effect a balance and resolve any natural conflicts between natural resources development and environmental conservation.

However there still exists confusion with respect to details and regulations. One of the main problems regarding present legislation is to obtain a concensus of opinion or approved overall plan because of difficulties in inter-departmental coordination. Hopefully, the future, with our new Department of the Environment and the inclusion of all energy resources under the Energy Resources Conservation Board will provide this coordination and at the same time protect the public interest.

We weclome action by Government to formulate legislation and regulations and to augment and clarify the organization and mechanisms for their effective administration.

VIII. LEGISLATION AND TECHNICAL ASPECTS OF LAND RECLAMATION

We would like to go into some detail regarding many technical aspects of land reclamation after coal mining, but we do not believe that detailed discussion of these aspects will accomplish much through these Hearings. We urge the Government to allow industry an opportunity to participate in the actual detail development of specific regulations for any proposed legislation and recommend provisions for the right of appeal where regulations appear to be unreasonable or unworkable. The "draft position statement" issued by the Department of the Environment has provided only general indication of legislation under consideration and the full meaning and impact of many of the proposals are unclear. However, comments by industry and other interested groups at these Hearings, we are sure, will be helpful to the Authority in formulating its general recommendations.

In addition however, we feel that the very great differences in the geology, geography, plant life, etc. in each specific mine installation are so great that it would be futile and in fact harmful to try and identify in an Act every conceivable possibility and eventuality. For this reason we have grave reservations regarding hard and fast regulations regarding timing of various reclamation stages. The industry feels that general rules should be laid down in the Act and specific detailed proposals should be resolved after joint industry-government consultation with full consideration of the public presentations made at these Hearings. One point that should be made in respect to proposed Legislation - the industry deplores the suggestion that the government should attempt to expropriate or otherwise acquire leases or other mineral rights granted by the federal government prior to 1930. There are surely other more effective legislative means of protecting the public interest. In effect such action would be inconsistent with the reputation of resource development in the province of Alberta and our government's present position on the encouragement of such development with due regard for the environment.

Again at this point we would like to reiterate the industry's concern for restoration of the environment to a degree that is compatible with practicality from both the standpoint of the economics of the operation and the desires of the public with regard to contouring and revegetation.

IX. RECOMMENDATIONS AND CONCLUSIONS

We are a resource oriented province. Our high standard of living has resulted, in large measures, from the export of our natural resources. These resources must continue to be fully utilized if we are to maintain, let alone improve, our living standards. Our Legislation must be framed to make the best possible use of them for the benefit of all segments of the community. We cannot live by tourism or recreational pursuits alone. We can, however, use our natural resources without deterioration of our environment if we plan in advance.

We would again wish to emphasize that the wide spectrum of conditions ranging from the comparative lowlands of the prairies to the mountain heights, and from the relatively dry chinook belt of the south to the muskeg of the north, precludes the practicality of hard and fast, detailed rules suitable for all conditions. We therefore recommend that any guidelines be as general as possible in keeping with the objective of successful environmental control. While we are making excellent progress in the field of reclamation and pollution control, there are still areas which require further research before the ultimate solutions are found. We recommend joint government and industry activity to find these solutions. We however feel the dangers of hastily conceived legislation are very real.

In order to alert ourselves to the dangers of hasty action, we need only look to the edict by President Nixon requiring removal of lead from gasoline in the United States. A simple solution involving the addition of a $60 catalytic converter was envisaged. The estimates for such a converter now range from $300 to $600 per car, with reliable sources stating such converters will not last as much as 50,000 miles, thus increasing the ultimate cost of each auto by $600 to $1200. In addition, converters require an increase in the amount of aromatic hydro-carbons added to the gasoline. Such additions cause emissions which are now suspected of being cancer accelerators.

The coal industry feels that with broad enforcable controls, agreements which are made between the Government and producers before the start of the project are the only practical effective solution. By this means the producer knows what his obligations are, what the cost will be and he can budget for these costs.

We do not disagree with the proposition that industry should be responsible for cleaning up its own operations, however we feel that all factors should be carefully studied and weighed to insure the solutions are realistic. The cost-benefit ratios should constantly be kept in mind.

We believe that any control measures should meet the needs of the citizens at large and not just reflect the demands of a small vociferous group, the existence of whose very jobs ultimately depend on the industrial activity which they are wont to discourage and in some cases, destroy.

In the final analysis, it is an irrefutable fact that upon industry depends the prosperity of the country, and foremost in industrial requirements is a healthy extractive arm for the production of raw materials and energy. It is of paramount importance that this axiom be kept clearly in focus during deliberations on the preservation of the environment. If we are to cope with the very serious problem of increasing unemployment, it is imperative that the most favorable conditions possible, consistent with reasonable environmental control be granted in order that as many natural resource developments as possible be economically viable.

Our summary conclusion is that the increased activity in the coal industry will have minimal temporary effect on the environment. The interest now being shown by an increasing segment of the public is a healthy sign. So long as the various factors are kept in their proper perspective and judgments are based on real knowledge of the conditions which exist we have every confidence that we can maintain indefinitely a suitable and attractive environment in Alberta and at the same time make the maximum use of our resources.

We would like to refer you to four public documents as reference material in assessing the comments made in this Submission:

1) THE PROBABLE ENVIRONMENTAL EFFECTS OF COAL MINING AND COMBUSTION IN WESTERN CANADA

Dr. N. Berkowitz
Research Council of Alberta

October 1969

2) THE REHABILITATION OF THE MINING ENVIRONMENT IN BRITISH COLUMBIA

J. V. Thirgood
University of British Columbia

April 1971

3) THE ECONOMIC IMPACT OF THE COAL INDUSTRY IN WESTERN CANADA

P. Simon
Foster Economics Ltd.

September 1971

4) A BACKGROUND FOR DISTURBED LAND RECLAMATION AND RESEARCH IN THE ROCKY MOUNTAIN REGION OF ALBERTA

E. B. Peterson & H. M. Etter
Department of Fisheries and Forestry

1970

RESERVES BY PROVINCES - ALL TYPES

(THOUSANDS OF SHORT TONS)

(2)

Province	RECOVERABLE				Per Cent of Total
	Measured	Indicated	Inferred	Total	
SASKATCHEWAN	291,500	7,024,000	4,698,400	12,013,900	9.7
ALBERTA	2,203,900	32,096,100	12,940,200	47,240,200	38.2
BRITISH COLUMBIA	7,328,600	11,175,400	40,953,000	59,457,000	48.1
OTHERS	1,637,000	1,291,000	2,024,000	4,952,000	4.0
CANADIAN TOTAL	11,461,000	51,586,500	60,615,600	123,663,100	100.0

RESERVES OF LOW & MEDIUM VOLATILE COALS

(ALBERTA & S.E. BRITISH COLUMBIA)
(THOUSANDS OF SHORT TONS)

(3)

Province	RECOVERABLE				Per Cent of Total
	Measured	Indicated	Inferred	Total	
ALBERTA	982,100	19,620,200	7,366,500	27,968,800	32.5
BRITISH COLUMBIA	6,943,000	10,775,000	40,480,100	58,198,100	67.5
TOTAL	7,925,100	30,395,200	47,846,600	86,166,900	100.0

SOURCES: GEOLOGICAL SURVEY OF CANADA, PAPER 70-58
COAL RESERVES OF CANADA - ROYAL COMMISSION - 1959

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

In respect of the costs of reclamation, assuming first in the prairies and then in the mountains, and assuming a pre-planned basis,to what percentage of the cost of the product might reclamation amount?

MR. GEORGE W. BARNES

It varies from region to region. This is a question that is almost impossible for me to answer. I might have some general ideas with projections that have been made by coking coal operations in the mountain area, and also thermal coal operations in the foothills area. We are going to have speakers here today: Mr. Stephenson from Canmore Mines is presenting a paper on mountain mining and Mr. Collins on thermal mining. They would be more qualified to speak.

DR. WALTER TROST

We have been given some understanding that these costs may not be a high percentage of the over-all value of the coal but may be an appreciable fraction of the profits that are realized. How difficult is it to pass on these costs to the purchaser of the coal?

MR. GEORGE W. BARNES

I would like to say that in the mountain areas we are only beginning land reclamation and in many respects we have no idea what the ultimate costs will be, either the costs of reclamation through programs designed and accelerated by our own industry, or by reclamation that may be imposed by changed legislation. It is a fluid and flexible thing to pin down what companies are actually looking at in cost at the moment in relation to what the cost might be tomorrow. I think there will be an astronomical change not only because of their own concern about reclamation, but because of new regulations.

We are dealing in a world market and at the moment most of our coking coal companies are locked into long-term contracts with very small escalation clauses. Negotiations will continually be taking place with our customers to try and absorb some of the additional costs. But it is a very difficult market we are dealing with. The Japanese do not necessarily have to have our coal. The price they are paying for our coking coal is in relation to the quality of the American coal. The price of coal depends on the quality of the coal and it ranges at $5.00 to $8.00 dollars a ton depending on the kind of coal.

DR. WALTER TROST

Although the competitive factor is tight on the export market, we understand from the submission of Canadian Utilities Ltd. in Edmonton, that the contract with the coal operator for coal for thermal purposes is an open end agreement.

MR. GEORGE W. BARNES

I do know that the mining operators that are mining thermal coal today are working on such a small margin that they do not have room to assume a large additional cost without passing them along to the power companies.

DR. WALTER TROST

Is there more leeway for you in the domestic market than the export market?

MR. GEORGE W. BARNES

I would suggest that any leeway that exists relates in the reflection of increased power rates that are very tight.

DR. WALTER TROST

In the domestic market, if there were an increase of 10¢ a ton to cover reclamation costs in the prairies, and that cost was passed on to the utility, can you tell us in any way what the increased charge the utility might have to make to the customer for the electricity?

MR. GEORGE W. BARNES

With my lack of understanding the economics of electric power production I am not qualified to answer that.

DR. WALTER TROST

Your general position is to support reclamation and the protection of the environment in the general development of coal mining in the three sectors of the province. Have you any developed position as to the level at which reclamation might be sensibly directed from the coal operators' point of view?

MR. GEORGE W. BARNES

Yes, there is a cost factor involved of course. We cannot turn the sow's ear into a silk purse. We are restricted by our market price in the mountain area for our coking coal. Our operators might want to go to extreme measures to restore the land beyond what it was before the coal mining operation, but certainly they would be restricted by the amount of money they could get from the marketplace. I think their philosophy is to restore the land to as acceptable a position as possible within the economics of the situation.

DR. WALTER TROST

At a certain stage in the reclamation process, the land is turned back to someone who will then use it. Do you wish to make comments on the point of that change-over and how it might bear on these matters?

MR. GEORGE W. BARNES

There has to be a reasonable space lag between reclamation and mining. It is reasonable to expect that some pre-planning should go into the eventual use of reclaimed land to the extent of perhaps involving people that might use this land in consultation.

DR. WALTER TROST

The question of site selection has come up time and time again and you did make comments on it. Your suggestion was that it was appropriate particularly in the mountains that there be some site selection. Do you want to elaborate on that?

MR. GEORGE W. BARNES

I was referring to isolated incidences such as the small area adjacent to Jasper Park, an alpine area, that was brought up by the Alpine Club in Edmonton. We do not know if there is any coal there but we might say, "This is adjacent to the Park and it is used by the Alpine Club, therefore we want to preserve this". I do not buy the premise that because there is a temporary disturbance of the landscape in an area where it may be visible to the public, that this should be a criteria for not developing it. The government can impose reclamation restriction that will restore it to its former state or even better.

MR. PAUL BABEY

You mentioned that the competitive position of the coal mining industries in terms of export markets is extremely keen. In one of the submissions that was made to us, the suggestion was made that if we let our coal resources lie at the moment until the other supplies were depleted, that the market would strengthen and in the future the market could command a higher price. I wonder if you would care to comment on that statement?

MR. GEORGE W. BARNES

As recently as last May, Mr. Holland who is Chairman of the National Energy Board, commented that if we sit on our energy resources forever we are going to find that we will probably never develop them. If we have an economic revival potential for any of our resources at the moment we should develop them. Man's ingenuity is going to eventually come up with forms of energy or sources of energy that we haven't conceived of at the present: solar energy, electromagnetic, using very small amounts of carbon. We have nuclear energy as an example in the last 25 years.

DR. STUART SMITH

You estimate roughly 25 million tons a year, 80% roughly which would be open case and 20% underground. Yet you say that this ratio could be drastically reversed. Are you implying that the real future for long-term development is underground labor-intensive rather than open case capital intensive?

MR. GEORGE W. BARNES

Definitely. I am firmly convinced that the 7% figure for open case mining is a reliable one and we are tending heavily toward open cast now because of the economics and the revenue that can be generated by the product. I am convinced that we are going to develop our coal industry in the future and that this will predominantly be underground operations.

DR. STUART SMITH

What is the present cost per man ton on a comparative basis between mining underground coking coal and open cast coking coal operations. What is the relative cost per ton?

MR. GEORGE W. BARNES

I cannot answer that question directly, but certainly underground mining is much more labor-intensive.

DR. STUART SMITH

Is the cost higher in terms of real economic benefits to the province? Or has this been analyzed?

MR. GEORGE W. BARNES

The cost of producing the coal?

DR. STUART SMITH

No. Is the economic benefit to the province greater with open-cast mining or is it greater with underground mining?

MR. GEORGE W. BARNES

It has not been specifically analyzed but there are so many factors involved with regard to open-case mining that mitigate the situation of labor-intensity in the mine site itself. This perhaps would have an economic reflection that would be a counter-balance.

4.2 SUBMISSION OF THE NATIONAL AND HISTORIC PARKS BRANCH OF THE DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT

TO THE

PUBLIC HEARINGS ON THE

ENVIRONMENTAL IMPACT OF SURFACE MINING IN ALBERTA

HELD BY THE

ENVIRONMENT CONSERVATION AUTHORITY OF ALBERTA

SOUTHERN ALBERTA JUBILEE AUDITORIUM

CALGARY, ALBERTA

DECEMBER 21, 1971

Presented by:

Mr. R.P. Malis,
Western Regional Director,
National & Historic Parks Branch.

Preamble

The National and Historic Parks Branch is responsible for the administration of the National Parks which are "dedicated to the people of Canada for their benefit, education and enjoyment" and are to be "maintained and made use of so as to leave them unimpaired for future generations".

As a result of this responsibility we have become acutely aware of environmental quality and problems associated with maintaining this quality, particularly in the National Parks. Unfortunately Nature does not recognize anything as arbitrary as a National Park boundary. Wildlife, wind and water do not stop or alter their functions at a line drawn on a map. An integral part of our responsibility therefore, is to do our utmost to ensure that developments outside Park boundaries are compatible with the natural resources located inside the boundaries.

To this end the Branch is pleased to have the opportunity to present this brief and we must commend the Government of Alberta for providing this public forum. We have used the public hearing method ourselves and have found it to be invaluable as an effective tool for information gathering even though controversy stimulating at times. Having been on the receiving end it is now our turn to offer what we believe are constructive suggestions directed toward common goals with the Province.

Position

The position of the Branch on the question of strip mining basically recognizes that a healthy economy is vital not only to the survival of Canada but also to the continued existence of the National Parks. Essential to such an economy is the wise utilization of our many resources which, of course, includes the extraction of sub-surface minerals. We further accept that in certain situations the only economically viable method of obtaining such minerals will involve the strip mining process. As a result we are not opposed to the principle of strip mining.

Proposal

The ever increasing number of visitors to National Parks across Canada has created over-crowding problems in most of our Parks, particularly the three Mountain Parks in Alberta. While we endeavour to provide a place for everyone, there is obviously a limit to the services we can provide without impairment to these Parks, which for the most part were designated for their ecological value rather than straight recreational value.

For this reason we welcome establishment of recreational facilities by private developers outside but adjacent to existing Park boundaries. In the somewhat similar issue involving the dedication of lands as Parks we have done some studies on the economic benefits of tourism. These returns calculated over a longer period often indicate social and economic benefits superior to those to be gained from some types of environmentally destructive resource exploitation.

In terms of visitor facilities, areas along access routes such as the Canmore corridor are ideally suited for recreational development. This assumes however, that an attractive natural setting is maintained.

Obviously, vacationers will have little desire to spend their precious free time next to a working mine, and it is desirable from our point of view that access corridors from major regional cities to the Parks be kept in as natural a state as possible, particularly if the corridor has a high scenic value and could be developed for recreation. This type of development would also allow the National Parks to concentrate more on improving the quality of the "Park experience" which is after all related to enjoyment, appreciation and knowledge of a particular natural environment more than varied and sophisticated recreation.

This is not to say that recreational development on the periphery of a National Park is suitable in every case. In our Mountain Park Public Hearings last Spring the Province supported our proposed zoning system which classified particular areas in categories ranging from wilderness to visitor services development. It follows that a cottage development adjacent to a wilderness zone would be inappropriate.

To a degree, the Province has already recognized this critical relationship of recreation to Park values and led the way at our Public Hearings in calling for close co-operation by means of a Continuing Committee of all three levels of Government to integrate our various Park plans. We support this concept and see in it a vehicle for dealing with many aspects common to our jurisdictions.

We could hardly disagree with the proposed legislation described in the position paper by the Province. We have common goals as well as common problems and we will be looking to the Province to assist us in achieving the one and solving the other.

Items specified in the position paper as areas of concern affect us as well. Road construction, sand and gravel operation, sanitary land fill and waste burial in particular are becoming more and more serious problems in the National Parks. With our obligation to maintain the Parks "unimpaired for future generations" we must find new areas outside our boundaries for borrow pits and waste disposal. In this we will be negotiating with the Province but in order to minimize environmental damage the same kind of study and precautionary measures dictated in the proposed legislation for strip mining will be called for, even though on a relatively minor scale. Also, the Provincial Paper mentions road construction and transportation of coal as areas for public comment. Given the existing heavy traffic load in some National Parks, the Branch would, of course, be most interested in putting forth our views on such developments as they relate to National Park areas.

Furthermore, our mutual commitment to provide information to the public for their use in commenting on development proposals brings in another area of expertise and opinion which has a definite impact on decisions.

If the Province finds it desirable, then, we would be pleased to participate in any studies undertaken with respect to plans for land use near or affecting National Park areas.

Here the groundwork for co-operation has been laid by the Province's assurance to the Branch that artificial developments will stay outside a one mile buffer zone around Banff and Jasper National Parks.

With this spirit of co-operation already established we in turn are ready to provide professional and technical personnel to assist in evaluating the ecological and environmental factors involved in any studies in which we are asked to participate.

We do not make this proposal with preconceived ideas. There are many unknowns to be considered such as the effect on animal migration routes and habitat of fauna common to Provincial and Park lands. As well we both share a concern for water quality which can be adversely affected by mining.

Specifically, the Branch is interested in a combined impact study on the possible development of the

Dog Rib Creek deposit on the Panther River drainage adjacent to Banff National Park and the Cadomin Mountain Park deposits just East of Jasper National Park.

In these and other studies the two jurisdictions have common goals. National Parks are integral units figuring in the economy of their localities and the Province as a whole. Their protection is as much of a necessity to Municipal and Provincial governments as it is to the Branch.

We are certain therefore, that we can work together to minimize environmental damage to the betterment of us all while not restricting vital economic development.

Again, we wish to thank the Province for granting us this opportunity to set forth our views.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

You mentioned a one mile buffer zone around the national parks. You also made a separate comment on the need for buffer zones in certain circumstances. Is that one mile an adequate buffer zone for your purposes?

MR. R.P. MALIS

It would depend on the scope and scale, the form of development and the sensitivity of the area and vicinity of the Park. In some cases I do not think it would be adequate. Many of the wildlife migratory patterns, elk for example would certainly go outside this one mile zone.

DR. WALTER TROST

It is a thing to be looked at on each specific occasion?

MR. R.P. MALIS

Correct.

DR. STUART SMITH

I am sure you are aware of the substantial numbers of wild animals which summer in the parks and winter in provincial territory. Your biological advisers in the Canadian Wildlife Service, have they completed studies or do they plan to do studies on the impact of this kind of resource use on those animals which at one time belong to Canada; another time to Alberta?

MR. R.P. MALIS

There are specific studies going on. We have embarked on a broad study which affects each one of our national park units and is a very detailed resource inventory of all the natural resources in a national park. This will provide valuable information which would lead to the type of information that you require.

4.3

ALBERTA COAL LTD.
P O Box 2880
Calgary, Alberta

BRIEF
TO
THE ENVIRONMENT CONSERVATION AUTHORITY
ON
21 DECEMBER 1971

Presented by A. F. Collins

The Environmental Impact of Surface Mining in Alberta

INTRODUCTION

Mr Chairman, Members of the Authority, other groups and the public present, we welcome this opportunity to appear before you today.

Alberta Coal Ltd. is one of the Mannix Group of Companies --- wholly Canadian owned ---- in fact, wholly Alberta owned and operated.

Fred S. Mannix came to Alberta in 1904. The Mannix family has been here ever since - and intends to be in business here for many years to come.

We are citizens of Canada and of Alberta and as such we are as concerned as any one else about the beauty of this Province and the preservation of our heritage.

Alberta Coal Ltd. is the largest producer of coal in Canada today, having in 1970 produced approximately 38% of all the coal mined in Canada. We operate four mines in Alberta and all are operated by the "surface strip" method.

The Coal Mining Industry of Alberta is in a period of rapid expansion and modernization in preparation for a greatly increased volume of production for domestic use and for export purposes.

It is not surprising that announcements of plans for large scale surface coal mining in the Alberta plains and foothills areas should evoke fears of extensive land devastation. Although perhaps no worse than that of other extractive industries, the record of the coal industry in North America in such matters as waste disposal, pollution control and mined-land reclamation is, on the whole, not an enviable one. In several regions - most notably perhaps in the eastern United States - the desolation caused by surface coal mining does, in fact, still bear eloquent testimony to past neglects. But if there is to be meaningful action to prevent that history from repeating itself here in Alberta, more will be gained from identifying problem areas and appropriate remedial measures than from harping on past industrial misdemeanours in other areas of this Continent.

The central fact is that environmental consequences of any industrial activity depend almost entirely upon conditions at the actual site of such activity. Should this appear to limit the validity of any general assessment such as this brief attempts to offer, it also negates arguments which proceed from events at other places and other times. To assert, for example, that surface coal mining in Alberta in the 1970's and 80's will destroy the local environment in much the same way as surface mining in the eastern United States did in the 1930's is not only technically faulty because it ignores important regional disparities but is also invidious because it discounts all mining engineering advances, practical experiences and new legislation of the intervening years.

SURFACE MINING, ITS NATURE, EXTENT AND SIGNIFICANCE

Stated in the simplest terms, surface mining consists of nothing more than removing the top soil, rock, and other strata that lie above fuel deposits to recover them. In practice, however, the process is considerably more complex.

When compared with underground methods surface mining offers distinct advantages. It makes possible the recovery of deposits which for physical reasons cannot be mined underground; provides safer working conditions; usually results in a more complete recovery of the deposit; and, most significantly it is generally cheaper in terms of cost-per-unit of production. Surface mining is not applicable to all situations however, because the ratio between the thickness of the overburden that must be moved in order to recover a given amount of product places a definite economic limitation upon the operator. While this ratio may vary widely among operations owing to differences in the characteristics of the overburden, types and capacities of the equipment used, and in the value of the coal being mined, it is nonetheless the factor that primarily determines whether a particular mining venture can survive in a competitive market.

The procedure for surface mining usually consists of two steps: prospecting or exploration - to discover, delineate and prove up the ore body - and the actual mining or recovery phase. Topography and the configuration of the deposit strongly influence both. Exploration techniques generally employed consist of either drilling to intersect deeper lying ore bodies, or excavating shallow trenches or pits to expose the ore. Although drill sites or excavations associated with exploration are usually small, their large number may constitute a serious source of surface disturbance in certain areas. Surface methods employed to recover minerals and fuels are generally classified as:

(i) Open pit mining (Quarry, open cast)
(ii) Strip mining (Area, contour)
(iii) Auger mining
(iv) Hydraulic mining

Open pit mining is examplified by quarries producing limestone, sandstone, marble and granite; sand and gravel pits; and large excavations opened up to produce iron and copper. Usually in open pit mining, the amount of overburden removed is proportionately small compared with the quantity of ore recovered. Another distinctive feature of open pit mining is the length of time that mining is conducted. In stone quarrying and in open pit mining of iron ore and other metallics, large quantities of ore are obtained within a relatively small surface area because of the thickness of the deposits. Some open pits may be mined for many years - fifty or more. However, since coal beds are comparatively thin - the Alberta average being about 10' for subbituminous coal presently being mined - the average surface coal mine has a relatively short life.

Area strip mining usually is practiced on relatively flat terrain. A trench or "box cut" is made through the overburden to expose a portion of the deposit which is then removed. The first cut may be extended to the limits of the property or the deposit. As each succeeding parallel cut is made the spoil or overburden is deposited in the cut just previously excavated. The final cut leaves an open trench as deep as the thickness of the overburden plus the ore recovered, bounded on one side by the last spoil bank and on the other by the undisturbed highwall. Frequently this final cut may be a mile or more from the starting point of the operation. Thus area stripping, unless graded or levelled, usually resembles the ridges of a gigantic wash board. Coal accounts for the major part of the acreage disturbed by this method.

Contour strip mining is most commonly practised where deposits occur in rolling or mountainous country. Basically, this method consists of removing the overburden above the bed by starting at the outcrop and proceeding along the hillside. After the deposit is exposed and removed by this first cut, additional cuts are made until the ratio of overburden to product brings the operation to a halt. This type of mining creates a shelf, or "bench", on the hillside. On the inside it is bordered by the highwall which may range from a few to perhaps more than 100' in height and on the opposite, or outer side, by a rim below which there is frequently a precipitious down slope that has been covered by spoil material cast down the hillside. Unless controlled or stabilized, this spoil material can cause severe erosion and land slides. Strip mining in the foothills in Alberta is and will be conducted on hillsides where the coal beds outcrop parallel with the mountain crests. Although most of the operations are conducted on natural slopes of less than 15° the beds themselves vary in pitch up to 60°. Beds that are stripped in the foothills are generally thicker than the beds on the prairies, vary from ten to fifty feet and can be mined economically to much greater depths. Because of the angles at which the beds lie the methods employed may not be correctly identified as either contour or area mining but rather as a combination of both. In a few instances, the operations may resemble open pits and quarries while others are long, deep, narrow canyons.

Auger mining is usually associated with contour strip mining. In coal fields, it is most commonly practised to recover additional tonnages after the coal - overburden ratio has become such as to render further contour mining uneconomical. Augers are also used to extract coal near the outcrop that could not be recovered safely by underground mining efforts. As the name implies, augering is a method of producing coal by boring horizontally into the seam, much like a carpenter bores a hole in wood. The coal is extracted in the same manner that shavings are produced by the carpenter's bit. Cutting heads of some coal augers are as large as 7' in diameter. By adding sections behind the cutting head holes may be drilled in excess of 200'. As augering generally is conducted after the strip mining phase has been completed, little land disturbance can be directly attributed to it. However, it may to some extent induce surface subsidence and disrupt water channels.

In hydraulic mining a powerful jet of water is employed to wash down or erode a bank of earth or gravel that either is the overburden or contains the desired ore. The ore bearing material is fed into sluices or other concentrating devices where the desired product is separated from the tailings or waste by differences in specific gravity. As both hydraulic mining and dredging create sedimentation problems in streams strict controls must be maintained over these techniques, either through mining or water control regulations.

Regardless of the equipment used, the surface mining cycle usually consists of five steps:

(i) Site preparation, clearing vegetation and other obstructions from the area to be mined, and constructing access roads and ancilliary installations - including areas to be used for the disposal of spoil or waste;

(ii) Removal and disposal of overburden.

(iii) Excavation and loading of ore.

(iv) Transportation of the ore to a concentrator, processing plant, storage area or directly to market.

(v) Reclamation

Reclamation may not be considered by some as an actual component of the mining cycle. Experience has demonstrated however, that when reclamation of the land is integrated into both the preplanning and operational stages, it can be done more effectively and at a lower cost than as a separate operation. This is particularly true because much of the machinery used in the mining operation can be easily used in reducing peaks of spoil piles, segregating toxic materials, and establishing control drainage from the site.

The rapid expansion of surface mining since World War II may be attributed primarily to the development of larger and more complex earth moving equipment. Equipment used today in Alberta includes bulldozers, loaders, scrapers, graders, trucks up to 150 ton capacity and a miscellany of other devices. Shovels and draglines of up to 35 cy. capacity are in operation and larger ones are being planned.

EXTENT

An estimated 8,000 acres of land, about 13 sq. miles, have been disturbed by surface mining for coal in Alberta up to and including 1971. This total includes only the excavation, or pit, and areas required to dispose of waste or spoil from the mining operations alone and does not include acreage affected by the mine access roads and exploration activities.

Harmful off-site effects are also an important component of the surface mining picture. These effects include stream and water impoundment pollution from erosion and acid mine water; isolation of areas by steep highwalls; and the impairment of natural beauty by the creation of unsightly spoil banks, rubbish dumps, and abandoned equipment. All of these add to the total land that must be considered as being adversely 'affected' by surface mining.

SIGNIFICANCE

The economic potential of any Nation is founded primarily upon its soil, its water, and its mineral deposits. Where these are deficient, the economic well-being of the Nation will depend upon the ability of its people to import raw materials required to manufacture and compete successfully in world trade.

Canada is blessed with a wealth of natural resources, needing only to import a small portion of its total mineral requirements. Thousands of firms are engaged in the production of semi and finished goods. These industries are supported in turn, by a wide variety of extractive and processing activities and services. The extractive industries are the primary source of metallic ores and non-metallic minerals and fuels - with agriculture and forestry contributing a wide range of products. Our population, with its varied skills, completes the design and confirms an old truth: Man creates nothing - it is only through his ability to produce crops, convert, process and synthesize that his civilization flourishes.

The importance of surface mining to the coal industry is easily measured. In 1971 for example, surface mining accounts for about four-fifths of the coal produced in Alberta and of this total about four-fifths is used directly as an energy source in the thermal production of electricity. Thus the relationship of coal to other industrial activities is quite clear. But the story does not end there. As a consumer, the coal industry is also a substantial contributor to the economy. Many industries are needed to equip and maintain the coal mining industry in Alberta.

ENVIRONMENTAL IMPACT

Technically and for convenience environmental consequences of surface mining activity can be divided into four distinct categories:

(i) The first comprises so called ecological effects, i. e. disturbances of the existing local flora and fauna and of the natural relationships between plant and animal species, through incursion into a wilderness area.

(ii) The second encompasses topographic effects, i. e. accidental or deliberately engineered modification of the surface or nearsurface structure of the site, and can include changes in local hydrologic attributes through partial blockage or actual diversion of a stream.

(iii) The third contains processes resulting in physical deterioration of the environment through pollution by airborne dusts and other debris.

(iv) The fourth defines various items of chemical pollution, e. g. contamination of air with noxious gases or discharge into soil or water of dissolved matter that may be harmful to terrestrial or acquatic life.

In practice, these effects will generally interact; and on occasion such interaction may be very complex. For example, in mountainous terrain relatively minor ecological changes caused by removal of top soil can have important topographic and secondary ecological repercussions through excessive erosion or rock slides which in turn can bring about physical pollution through creation of airborne dusts. And partial obstruction of a freely flowing stream by carelessly discharged, though in itself quite harmless, debris may not only hold topographic and ecological consequences, but also lead to chemical pollution that would be dissipated and rendered innocuous by fast water flow. For purposes of this brief and in order to assess their relative importance in any one region of Alberta, it will be helpful to treat these environmental consequences as if they were substantially independent effects.

Any general survey of environmental effects must necessarily deal in probabilities; while they can define what may happen, clearly they cannot establish what actually will happen at any particular site in the Province. However, with respect to the consequences of surface mining in the plains regions of Alberta we are able to draw a fairly firm conclusion. What simplifies the situation in this region is the fact that where coal is most easily accessible, surface contours and the nature of the terrain make any hazardous topographic change through surface mining next to impossible. Provided that mining is followed by appropriate land reclamation, coal stripping operations which are certain to remain the coal industry's preferred method will in fact be topographically neutral.

Given the type of indigenous flora and fauna which Alberta surface mining sites support, there is also little reason for anticipating significant ecological damage. Where operations invade natural grazing areas, there will, of course, be some displacement of wild life. Except where they make major incursions into areas where present land uses have already upgraded the surface environment --- and such incursions seems remote --- reclamation will more often than not leave sites substantially better endowed than they were when mining began.

Aside from the matter of mined - land restoration, the more pertinent question therefore is whether, or to what extent, surface mining in the prairie areas of Alberta is likely to cause unacceptable environmental damage through pollution.

This matter is not immediately resolved by the fact that most mining operations are well removed from urban areas; polluted air and water do not necessarily remain near the source of the pollution. But geographical remoteness is not entirely irrelevant and it gains further importance when placed in context with the properties of Alberta's prairie coal. As a general rule, a coal mine is only a source of chemical pollution to the extent that it improperly discharges acid mine waters, i.e. effluents which form when pyritic sulphur associated with the coal is oxidized by air and the resultant sulphur oxides entrained to produce dillute sulphurous/ surphuric acid mixtures. However, unlike Eastern United States and most European coals which commonly contain 2% or more pyritic sulphur, and which therefore often creates quite serious problems through acid mine waters, Alberta prairie coals carry no more than 0.2 or 0.3% pyritic sulphur. The remainder of their analytically determined sulphur contents is organically bound to carbon and not amenable to atmospheric conversion into S02 or S03. Accordingly, pollution from these sources is therefore likely to be insignificant. It is also worth nothing that in surface mines where the coal body is exposed and consequently able to equilibrate with the drier air, small accumulations of acid mine waters would in any event tend to be absorbed into the coal rather than to be discharged from it.

The same is true of possible air pollution from smokes and oxides of carbon generated by mine fires. In active workings, the probability that fire will go undetected and out of control is so remote that it can be dismissed. Only in improperly abandoned operations, where conditions allow spontaneous ignition, it is likely to be a real contingency. But even here, the risk of fire is directly related to pyrite concentrations and on the Alberta prairies that risk will therefore be negligible even should the mine site remain open and inoperative for comparatively long periods. Burning coal outcrops that have been reported from time to time have generally occurred where there was no mining. Apparently triggered by prairie grass or forest fires they are, like such fires, natural hazards unrelated to industrial activities. There is somewhat greater danger from uncontrolled self-initiated combustion in storage piles, in which ignition can be triggered by alternating partial drying and wetting; but this danger is well understood and easily eliminated by proper construction of the stockpile.

For all practical purposes the real problem area presented by pollution thus narrows itself to physical pollution of air or water by discharged solids. In fact any such contamination still appears to be minimal. Visual observation at all of the currently operating surface mines in Alberta, suggests that neither mining nor haulage to the respective marketing points creates appreciably more dust than ordinary traffic over secondary roads raises. Also there is no evidence that surface mining adversely affects the volume, flow or quality of any of the water bodies adjoining these sites.

So long as major surface mining operations in the Alberta prairies remain relatively far from urban centres, present mining methods and normal precautions seem therefore quite adequate for ensuring that the environment is not violated. It does not appear that surface mining in Alberta on the prairies constitutes any tangible threat to the environment, or that the public interest need concern itself with more than the question of what constitutes acceptable mined-land reclamation.

Now let us turn to the foothills areas of Alberta where the terrain and therefore the surface mining problems are quite different from those on the prairie regions. What will eventually determine industrial development potential in the foothills areas of Alberta is public concern over pollution and the increasingly vociferous defence of the entire foothills belt as a recreational reserve from which industrial activities might as far as possible be barred altogether. In this connection neither the much larger scale of coal surface mining now projected nor the fact that some of the new mining ventures will invade previously untouched wilderness areas are likely to escape notice. There is little question that environmental damage through past mining in the foothills area of Alberta has been grossly exaggerated, and that some of the fears to which currency is now being given can be discounted. Quite aside from the fact that the combined area involved in the present and projected mining activities is relatively small, it is worth observing that no mining venture will intrude into a unique wild life habitant and that no mining venture is large enough to destroy any significant segment of such animal domain as it and its surrounding area actually constitutes. While each mine and its associated traffic facilities will necessarily, as is so in the plains areas, remove some surface cover and cause some displacement of wild life, real ecological damage is only likely to accrue from careless mining procedures. Adequate control over local topography in connection with surface mining in the foothills will undoubtedly pose greater problems than similar mining in the prairie areas. However, the permanent recontouring of terrain which surface mining operations necessarily entail in the foothills areas can, in itself, hardly be objected to. However, badly programmed overburden removal or spoil bank construction could cause serious difficulties through land slides, excessive erosion and water pollution. And poorly planned site preparation could also make eventual surface reclamation difficult and costly. Stripping procedures that would be perfectly acceptable in the plains, therefore will, in many situations, not be so in the foothills areas. What accentuates these problems is the multiplicity of small streams which traverse much of the foothills terrain in which mining is scheduled. However, Alberta's mountain coals will not cause actual chemical contamination of air or water, nor will the mine effluent. Experience has shown that these effluents are actually harmless or that they can easily be rendered so by passage through simple settling tanks. Despite some statements to the contrary these effluents are non-acidic with pH values generally running near 6.7 and that their principle undesirable constituent is readily flocculated iron. But because the foothills coals are almost always highly stressed and fractured, they are, if allowed to dry out, liable to create considerable airborne dust and unless properly handled and disposed of, could also pose some threat to unobstructed flow of nearby creek waters. It is, in this connection, relevant to observe that bituminous, unlike sub-bituminous coal is markedly hydrophybic; fine particles discharged into a stream will therefore tend to float, to accumulate along the banks, and if present in sufficient quantity, may cause more or less severe silting.

These matters, which bear as much upon topography as upon pollution, gain further importance from the fact that all presently planned foothills mining operations will also involve cleaning, sizing and thermal drying of the coal. From a purely technical standpoint, this does not necessarily intensify problems of topographic and pollution control. However, the introduction of additional material handling stages could conceivably increase the dust nuisance. And since even minimal discharge of refuse or insufficiently clarified washery effluents into streams, is unlikely to escape public censure or action under antipollution statutes, acceptable waste disposal will undoubtedly demand that coal producers direct particular attention to the design, placement and efficiency of refuse catchments as well as to the type of coal storage and processing facilities. This applies with special force to the location and construction of washery refuse spoil banks. Because of their high contents of bentonitic clay such banks are more liable to slide than overburden spoils and to pose greater danger of water pollution; and they may also prove troublesome through self-ignition and sustained slow combustion.

It should be emphasized however, that none of these problems constitute difficulties beyond economically acceptable technical control and all are avoidable through proper programming of the surface mining operations.

It should also be emphasized that there are beneficial effects to surface mining in the foothills areas. When massive rocks are fragmented during surface mining, the resulting piles of material contain considerably more void space than existed in the fractures, partings, and pore spaces of the undisturbed rock. As a result, certain desirable hydrologic effects may occur. The danger of floods is diminished because a significant portion of the rainfall is trapped in depressions and behind the spoil banks where it sinks into the earth to augment ground water supplies, rather than running off rapidly to nearby streams. Because water stored in the banks moves slowly, drainage will continue for a long time before the water level declines to that of adjacent streams. Thus, streams near surface mine areas often maintain a longer sustained flow during dry weather than those draining undisturbed ground. At some surface mining operations along mountain sides the pits will impound surface runoff from rain and snow melting, will minimize the sediment load of streams draining the area, and effect considerable ground water recharge as well.

Many mine access roads, when properly repaired and maintained, can be of considerable value since they may be used to promote the multiple land use potential of extensive areas. Accessibility for fire protection, recreation and forest management activities can mean the difference between use and isolation. For example, by improving fire protection, investments can be made more safely in growing timber, and hazards to human and wild life considerably reduced. Where massive equipment is used in the mining process the access roads are usually well constructed and the cost of repairing and maintaining them would be low. By converting some of these roads to public use, tourism can also be encouraged as several surface mining sites are or will be located in areas that afford spectacular views of mountains, valleys and lakes.

Surface mining on the prairie areas has created many opportunities for the development of recreational areas where none existed before. Water in the form of small ponds or lakes, and the spoil piles themselves, frequently provide a pleasant topographic change in areas of virtually flat land.

We therefore come to the question of mined-land reclamation. There should be a recognition that properly conducted surface mining and land beneficiation pose little hazard for the environment and that the modern coal mining industry can now be expected to conduct itself in a manner to defend its corporate image and that public concern need extend only to the matter of the proper abandonment of mined-out areas. All large Alberta coal producers accept reclamation as an integral part of their overall mining operations and already have reclamation projects actively in hand. There need be no disagreement over the extent of such reclamation. It is taken as axiomatic that the appearance and quality of the reclaimed surface mining site ought not to be inferior to what existed before mining began and it is fully appreciated that even comparatively modest expenditure on surface restoration could, with proper planning, often allow it to be materially upgraded. If there is any uncertainty at this time it relates mainly to how a reclaimed site ought to be contoured. For example in the prairie areas, whether the land should be completely levelled or whether as some game management interests might on occasion prefer, a more undulating terrain with effective relief in an otherwise flat region should be created. However, unlike the prairie areas where placement and recovery of productive soil and spoil banks is generally a simple matter, the terrain in the foothills areas imposes definite restrictions on surface reclamation. At high elevations, where natural plant cover is either absent or scanty and stunted by climate, and a rocky, almost soilless surface exists, reclamation in the commonly accepted sense is clearly impossible. And even at a less extreme heights considerable experimentation will undoubtedly be necessary in order to arrive at selection of appropriate seeds, seedlings and seeding techniques. In many instances, therefore, reclamation will, as in the case of lumber operations, mean concern with post-mining cleanup and overall aesthetics rather than with actual site restoration.

What this implies, of course, is that statutory provisions covering mine-land reclamation in Alberta will have to be flexible if they are to be effective. Because of wide variations in climate, terrain and surface qualtities at surface mining sites in Alberta a comprehensive uniform set of regulations is not likely to be meaningful. And neither is a set of provisions patterned in any way on legislation in other jurisdictions which are influenced by coal and terrain characteristics unlike those encountered in Alberta.

As a general observation, in Alberta where there is such a wide variety of climate and geology involved, it is only logical that there will be wide varieties of reclamation potential. It should also be remembered that what the land produced before the surface mining commenced is a fairly good indicator of what it can produce after strip mining has been completed. If the land grew timber once, it can grow timber again. If the land grew cereal crops once, it can grow cereal crops again. If it grew sage brush once, then that may be all that can ever be obtained from it. And if its principal crop was lichens before the rocks were turned over to reveal the coal, it may never produce anything but lichens.

PERSPECTIVE

It has been stated that strip mining ravages the countryside, leads to pollution, destroys animals and fish, creates water hazards and drainage problems and generally lays waste to our heritage.

In order to place the whole situation of strip mining in Alberta in its proper perspective let us look at some fact and figures, some statistics and some interesting economics:

PROVINCE OF ALBERTA TOTAL AREA

255,285 sq. miles or 163,382,400 acres -- of which approximately one half is arable land.

CITY OF CALGARY TOTAL AREA

1948	39.6 sq. miles or 25,368 acres
1971	155.8 sq. miles or 99,712 acres --

A growth of 116.2 sq. miles or 74,344 acres in 23 years.

The total area of Alberta which has been disturbed by surface mining for coal by all coal mines, past and present, to date, is approximately 13 sq. miles or about 8,000 acres of land -- even after a grand total of over 60 years of operation at high production rates the total area of disturbed land is comparatively small when compared with any other form of land use. Super highways, highways, section line roads, city expansion, water reservoirs and the like use up far more land in any given period than strip mining has ever or will ever use in this Province.

Let us look at just the expansion of the City of Calgary alone in the last 23 years. Prime farming country has been used upon which to extend the City of Calgary. Air pollution has increased immeasurably from furnaces, fireplaces, sewage, garbage, buses, cars, processing plants and effluents discharged both into the air and into the water, the industrial expansion alone creating many forms of waste products disposal problems.

As noted above the area of the City of Calgary alone in the last 23 years increased by over 74,000 acres which exceeds by over nine times the 8,000 acres disturbed by all the coal strip mining ever performed to date in the whole of Alberta; and we should remember that the land covered by our cities is lost forever for production purposes, while this is not true of land disturbed by strip mining.

EXTENT OF POTENTIAL STRIP MINING AREAS

Total Surface Area of the Province of Alberta is 255,285 sq. miles.

FOOTHILLS AREAS UNDERLAIN BY COAL
(estimated)

In foothills belt (lower cretaceous	1,040 sq. miles
Out of foothills belt (principally upper cretaceous)	4,020 sq. miles
Total foothills coal areas	5,060 sq. miles

It is estimated that less than 1% of this coal could be recovered by strip mining, i.e. approximately 50.6 sq. miles or $\frac{2}{100}$ ths of 1% of the total surface area of the Province.

PLAINS AREAS UNDERLAIN BY COAL
(estimated)

Belly river formation	25,800 sq. miles
Edmonton formation	14,800 sq. miles
Total	40,600 sq. miles

It is estimated that 5% of this coal lies under less than 100 ft. of ground cover, which amount of cover is the generally accepted maximum possible economic condition for strip mining in these areas even for the thickest seams of coal, i.e. 5% of 40,600 = 2030 sq. miles = $\frac{80}{100}$ ths of 1% of the total surface area of the Province.

As can be seen therefore, the estimated maximum total surface area which might ever be strip mined is 82/100ths of 8/10th of 1% of the total surface area of the Province.

ECONOMICS

To divorce environment from economics is impossible. All of the people of Alberta should be thoroughly against pollution and impairment of our environment while at the same time being thoroughly committed to the proposition that mankind should strive to enjoy the highest standard of living the environment can provide.

It can be demonstrated that a sizeable strip surface coal mine in Alberta can mine and recover coal in the order of 20,000 tons per acre. Using, say $2.50 per ton as the total mine cost of that coal, we can readily see that over $50,000 worth of coal can be produced per acre and this amount therefore can be the economic benefit of this natural resource per acre of land.

Even at 25 bushels per acre per year of wheat from the same acreage, the earning power of each acre per year under conventional farming methods would take over 1,000 years of production in order to provide the same economic benefit.

Of interest also might be the fact that, using the above examples, the general revenues of the Province also receive $1.00 per acre per year in rental plus 10¢ per ton of coal mined or for each acre as mined in the example above the sum of $2,000 royalty per acre.

In the year 1971 upwards of $600,000 will be paid to the Province of Alberta by mining companies in the form of royalties on coal mined on Crown owned land. As approximately 60% of this coal is used for the thermal generation of power in this Province, it can readily be seen that the lower fuel cost to the power companies as a result of strip mined coal has a direct bearing on lower power cost to the consumer public --- but what is probably more significant the low power cost attracts industry to the Province, industry which will go elsewhere if power costs are to be increased in any significant amount by restrictive regulations and uneconomic and impractical reclamation procedures.

RECLAMATION AND RECOMMENDATIONS

Once we accept responsibility restore and preserve our environment, the goals of a Provincial long range reclamation programme come clear; repair and rehabilitation of areas damaged in the past, and the establishment of reclamation requirements that will minimize future damage to the land.

The reclamation of land disturbed by surface mining falls into two major categories:

(i) The elimination, or abatement of undesirable conditions, and

(ii) The development of restored land and water resources to more productive uses.

The first of these may be defined as "Basic Reclamation" or the minimum effort required to correct, at the earliest practical moment, undesirable on site and off site conditions caused by surface mining. This would include measures designed to alleviate or prevent erosion, acid discharge, and other physical and chemical after-effects of surface mining that generally are associated with derelict lands.

The second category, the rehabilitation of mined land for specific purposes would require more extensive treatment than for basic reclamation and also would require the expenditure of additional funds. Development of recreational areas, for example, would require some reshaping of the land before planting, and installation of sanitary facilities to ensure that streams will not be contaminated by further pollution. For example in a mine reclamation project close to an urban setting, the project would require considerable grading and possibly planting before it could be adapted to residential, commercial or industrial sites. Such rehabilitation could involve the development of surface mined land for specialized purposes and such land might serve more than one purpose or be developed for a use other than its original use. Some examples are as follows:

(a) Crop Land - Land treatment required, in addition to that necessary to achieve basic reclamation would be grading to a more nearly level topography; burying large rocks, incorporating fine material and organic matter in the top four to six inches of the spoil; providing for adequate water movement off the area; and fertilizing to ensure satisfactory initial survival and growth.

(b) Pasture land - For this purpose additional treatment would include grading to a topography not to exceed a 15 to 18% grade -- smooth enough to permit the operation of farm equipment needed to plant and harvest forage crops. Soil conditions, of course, would have to be suitable for grasses and legumes, a standard which should be established from quality seed of improved and tested varieties.

(c) Range land - To convert surface mined areas to range land, less intensive treatment would be required than for pasture. In most areas of Alberta strike-off grading would be sufficient; however, development of water for livestock and for seeding might be required in some instances.

(d) Wild Life - In addition to the vegetative planning required to control erosion, specific game food and cover plantings would be needed to improve wild life habitant. This will entail additional labour, engineering and in some instances maintenance of the plantings. Additional costs would be incurred by the provision of waterhole and wet land development, construction or improvement of access roads and leasing of lands to assure management and public use of the areas.

(e) Recreation - In addition to basic reclamation some additional grading would be necessary, provision made for potable water supplies, and construction of the necessary sewage facilities to ensure a clean discharge to any streams. Additional costs would be incurred by the provision of trails, boat launching sites, picnic areas, ball fields and other similar facilities.

Prevention of Future Damage

Over a long term, the establishment of effective mining conservation and reclamation practices for future surface mining is more important than efforts to repair lands damaged in the past. Surface mining regulations must be framed so that land acreage disturbed annually does not ever exceed the amount reclaimed annually thus making sure that the backlog of unreclaimed land does not increase.

Industry should not alone be liable for overcoming any inherited reclamation backlog, but industry should be held responsible for seeing that the gap between land disturbance and restoration grows no wider. To accomplish this efficiently and economically will require the highest degree of co-operation and understanding among all levels of Government, industry and the public.

The amount that surface mining operators can afford to pay for reclamation varies widely among individual operations in this Province. In effect reclamation merely superimposes an additional charge upon variable costs structures that have already been largely determined by the economics of doing business. The costs of completely reclaiming land disturbed by surface mining in Alberta can range from $200 per acre to in excess of $1,000 per acre.

Feasible mined land reclamation criteria and goals should be established by the Province. Those charged with the responsibility of developing such criteria should give careful consideration to the following major objectives:

(i) Water quality control

(ii) Soils stabilization

(iii) Elimination of safety hazards.

(iv) Conservation and preservation of natural resources

(v) Restoration of natural beauty

It should be noted that each surface mining operation and locality has its own unique characteristics. It follows therefore that no single set of procedures will be universally applicable within the geographical boundaries of Alberta. Regulations dealing with reclamation activities therefore, will undoubtedly be more effective if they are couched in terms of results and objectives and provide enforcement officials with the flexibility needed to apply the regulations equitably to individual operations in various localities.

To implement such a programme, Provincial standards and requirements should be developed for the reclamation and rehabilitation of surface mining areas, in co-operation with industry, conservation and other public groups, various levels of government and other interested parties.

The Provincial Government should be prepared to make financial contributions to co-operators for the purpose of reclaiming and rehabilitating past surface mined lands. Provincial funds should be used for the purposes of developing land use plans and research and development programmes and provision should be made at public expense for the acquisition reclamation and conservation of mined land where the public interest requires such action.

Provincial agencies should impose effective coordinated controls upon all surface mining activities conducted within the confines of the Province.

In co-operation with the Federal Government, with Universities and with industry and conservation groups a thoroughly coordinated research effort is required in the fields of mining techniques, spoil handling, soil classification and soil treatment; growth and survival rates of various forms of plant life in various mined land environments; water quality and erosion control; and on land uses in mining areas. The Provincial Government, therefore, should not only promote and sponsor research in these matters, but should play an active role in introducing new or improved mining and reclamation techniques to mine workers and operating levels of management.

We would like to refer you to three public documents as reference material in assessing the comments made in this submission.

(i) The Probable Environmental Effects of Coal Mining and Combustion in Western Canada by Dr. N. Berkowitch, Research Council of Alberta - October, 1969.

(ii) The Economic Impact of the Coal Industry in Western Canada, by P. Simon, Foster Economics Ltd., September 1971.

(iii) Surface Mining and our Environment, by the U.S. Department of the Interior, 1967.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

In your view, under present technology, can strip mining in fact be economically done in such a way as to include reasonable reclamation effects?

MR. A.F. COLLINS

The key word is "reasonable".

DR. WALTER TROST

Would you elaborate on a reasonable reclamation level in the prairies and the mountains?

MR. A.F. COLLINS

This gets a little controversial. The "reasonable" to the operator and the person with the whole matter of reclamation in perspective is that the land be replaced and restored as close to its original state as possible. This is more readily possible on the prairies than in the mountains. The disturbed soil on the prairies can be put back as long as you allow for the normal growth period at the various elevations and sufficient time to allow land to come back. One of our mines has operated on land which, by aerial photographs and by expert testimony, can be shown to have been 65% muskeg before we mined it. Now, using the "reasonable" approach we should import some water and turn that land back into muskeg when we are finished. That does not make any sense. Each individual area of two to three square miles in this province has its own problems of reclamation, growth, improvement and potential. We consider that each individual area should be given thorough study but not based on regulations which hamper or hinder the individuality of that area.

DR. WALTER TROST

This perhaps ties in with what you are saying: The use of the land after reclamation may be by a developer or a farmer. How might the ultimate user be brought into the over-all planning in the best way?

MR. A.F. COLLINS

I think it is one which will give us trouble in the future. Using my example of the swamp land, that land is in fact worth nothing except for the gravel and coal in it. It will be substantially improved in that particular case by the disturbance which has gone on. For a business man, a golf course could probably be made economically viable? It would also make a tremendous course for snowmobiles which ecologists may object to, but as a business it would make a good run for them. It is a very difficult question to be particular about.

DR. WALTER TROST

For the prairies, you gave us figures for the total value of coal per acre that may in certain cases be extracted. Have you figures for the extra cost of reclamation per acre in a case that is farm land and is to be restored to farm land again?

MR. A.F. COLLINS

I am prepared to give you order of magnitude figures which are taken out of our experience at several places in Alberta. The overall reclamation costs, depending on the type of terrain on which you are operating, can run from $150.00 an acre, and this is basic reclamation, to an excess of $1000.00 an acre. So if you believe those figures you can see the very wide perameter of costs that are by actual experience, in this province.

DR. WALTER TROST

Is it true that those figures, even though they do cover a wide range, represent a small percentage of the value of the coal itself and consequently of the price per ton of coal?

MR. A.F. COLLINS

I would submit that it is not fair. It may be one method of doing it but it is not the fairest comparison to compare the price per ton of coal for the cost of reclamation. We could take it and apply it to the profit per ton, but if you would prefer we will do it both ways.

DR. WALTER TROST

I would like both ways. I would also like to refer it to the ultimate use of the land after reclamation. It seems that those are the three relevant indices.

MR. A.F. COLLINS

I am not sure that I can do the latter one. On the first, the best example that I can give you is one mine which is in Alberta. The reclamation costs are approximately .05¢ per ton which would be of the order of 4% of the total mine cost and would be in the order of between 20% and 25% of the mine profit. To the extent that those figures are accurate, this is a minimal cost. Any cost of the order of .05¢ a ton over a product that is worth $1.25 a ton when it is mined is not an insignificant percentage.

DR. WALTER TROST

Do you want to comment on the cost of reclamation as compared with what the land would be used for, the value of productivity after the land was reclaimed?

MR. A.F. COLLINS

At that particular mine the reclamation costs probably run in the area of $200.00 an acre, for land at that particular area which is marginal farming, reasonably good pasture. Somewhere in the area of $200.00 an acre, seems to us in the industry, enough to spend putting that land back into that kind of use.

DR. WALTER TROST

In reclamation procedures in surface cast mining is there a problem in finding the managerial and manpower skills that is needed for this kind of environmental management?

MR. A.F. COLLINS

No, we don't believe so.

MR. PAUL BABEY

You mentioned a figure of $200.00 to something in excess of $1,000.00 per acre as cost of reclamation. In your experience, on the plains, have you had costs that have exceeded the $1,000.00 figure quite substantially?

MR. A.F. COLLINS

No.

MR. PAUL BABEY

The reason I asked this question is because someone gave us a figure of $3,500.00 and I was wondering whether you had an experience of that kind. What is the time gap between the mining and the reclamation program that is to bring it to the development stage?

MR. A.F. COLLINS

In a mining operation of a million tons a year, because of operational requirements the mine pits would probably be three to five years before leveling and contouring. If we are going to extract coal from a seam underlying the prairie, we need to get about three to five years ahead of the actual reclamation work. As the mine progresses away from its starting point, reclamation work comes behind in orderly fashion.

MR. PAUL BABEY

In other words once you establish the pit area, the reclamation or at least replacing the overburden is simultaneous with the mining operation?

MR. A.F. COLLINS

I will give you a brief lesson in the strip mine if you like. The first cut or the box pit has the spoil on the side opposite the direction in which the mine is going to be developed, and then for each succeeding cut the spoil is placed in the hole or trench left by the first cut and so on. Depending on the configuration of the mine itself, by spoiling back into succeeding trenches you are actually out of the area of that first trench. The spoil pile is not available to be worked on for reclamation purposes and on a million ton a year mine, this could take as long as five years and probably couldn't in any event be handled before three years.

DR. STUART SMITH

Could you indicate what the relative proportions between coal you export and coal used in Alberta are?

MR. A.F. COLLINS

Our company at the moment is not involved in export. We operate two mines in Saskatchewan and four in Alberta. This year we will mine just around four million tons in Alberta and just around two million tons in Saskatchewan, 85% of which is used for the thermal generation of power.

DR. STUART SMITH

What do you personally think about the benefits of exported coal versus coal that is used within Alberta in terms of provincial benefits?

MR. A.F. COLLINS

It has no bearing that the economic benefits to the province are different and the economic parameters are different. The economic benefit to the province is substantial in either. As a thermal coal producer I might be a little biased at this moment but the fact is that our product is ends-up, the lights that we are using today are from coal being produced by our company at a economic level which allows us to enjoy one of the lowest power rates in North America.

There has been discussion about $22.00 coal. No coal has been shipped out of Canada to my knowledge at any price FOB higher than $19.00. With the ship loading cost, stockpiling cost in the port, the unloading from the freight train, the freight haul cost, and the loading cost into the freight car at this end the $19.00 translates itself back to mining cost of probably between $6.00 and $8.00. The economic benefit to the province starts at this point as the export coal has to be carefully processed, washed, handled, and loaded, all of which are reasonably labor-intensive functions that produce economic benefits.

4.4 SPEC. (SOCIETY FOR POLLUTION AND ENVIRONMENTAL CONTROL)

Presented by Dr. J. W. Kerr

STRIP MINING IN ALBERTA

Some of the damage that our environment is being subjected to is truly difficult to prevent because of jurisdictional problems. Among those that are truly difficult to solve is the poisoning of the ocean by pesticides, defoliants, and oil spills. Somehow we must stop killing the ocean, but that is an enormous problem to overcome, because every nation is involved. Nations have enough difficulty getting along when only two of them have to deal with each other, such as with the pollution of the Great Lakes. In that case only two countries are involved, but there are several levels of government, and many industries. So this also is complicated.

Today we are discussing an environmental problem that should be simple to solve - the strip mining problem in Alberta. It is relatively simple in that there is only one industry to deal with, the Alberta Government. It then should be a relatively easy environmental problem to overcome administratively. But it has not been easy; it has been extremely difficult. If this problem cannot be solved, when it should be so simple, we have very little hope of solving our more complex environmental problems.

In August of 1971, Albertans discarded an old government and elected a new one. One of the main reasons for the defeat of the former government was its intransigence and carelessness in dealing with the environment. Nowhere was this more obvious than in the area of strip mining of coal. Our new government has inhereted a set of laws dealing with coal, as well as a civil service to administer these laws. We recognize that the present elected government of Alberta has not had time to make changes in this area, and we most emphatically are not criticizing them. We applaud the decision to hold a public hearing on the environmental impact of strip mining in Alberta. Our criticism is directed only against the deplorable situation surrounding strip mining that our present elected representatives inherited. We recommend: (1) Replacement of the philosophy which places exploitation ahead of conservation, and (2) A change in the present antiquated laws that have allowed cavalier mining practises.

Let us first of all look at some slides that illustrate the problems resulting from strip mining of coal. Strip mines can destroy land, soil, water supply, and recreational potential.

We are fortunate today in Alberta because we have not yet had very much strip mining. Here we are in a position to avoid the catastrophic mistakes that were made in other places, most notably in the eastern U.S.A. Certain states in the eastern U.S.A. have sensible and effective laws governing strip mining. Unfortunately, however, they had to go through environmental crises before the mining men would allow the politicians to pass these laws. Kentucky now has a law that should be followed by Alberta as a model. Details of this law are described in a brief presented by SPEC to the government of Alberta in 1969.

The environmental damage from strip mining in Kentucky reached crisis proportions after many years of uncontrolled mining. This state has now largely solved the problem with current mines, but only after a tremendously difficult battle with politicians and industry. The situation was so bad that strip mining was the key issue in a state election. In 1966, a courageous man was elected Governor - Governor Breathitt. His main election platform was proper control of strip mining. Control has been effective there, and it has not hampered the mining industry. We emphasize this last point.

This photograph was taken from the air: (1) Shows a shovel in Kentucky that is capable of scooping up 65 cu. yards of rock at a time, and is used to uncover the coal. Two trucks beside it look pretty tiny in comparison; they could drive into its shovel side by side, and it could lift their weight along with a dozen or so others. This machine is capable of drastically modifying the landscape and our environment. Similar machines are now being used here in western Canada and some of the companies with bad records in the U.S. are operating here. For twenty years strip mining went on in Kentucky with reckless abandon, and it left spoil piles in long strips around the countryside. (2) Because these piles were unstable, they grew almost nothing and eroded rapidly, damaging the streams with silt and acid water. Scenes like this also are common on the Alberta Plains, but on a much smaller scale.

Under Kentucky's new law the plains operations are now controlled successfully by a Forestry Department, which requires two simple techniques. The first is levelling of the spoil ridges by a bulldozer that follows closely behind the big shovel. (3) A hydroseeder then sprays a mixture of grass seed, fertilizer, asphalt and water on the area. (4) The asphalt sticks the mixture to the rock. (5) The grass grows quite easily. At present former strip mines are being turned into recreational areas, and some are now being used for pheasant hunting.

(6) Strip mining in the plains of Alberta offers no serious technical problems, only administrative problems. Mining on the plains of Alberta is controlled by the Surface Reclamation Council and that body has allowed it to be done carelessly. Examples are at Forestburg (7), and Wabamun (8). The competence of the Surface Reclamation Council must be greatly raised. The Calgary Power Strip mining operation at Wabamun, west of Edmonton, operated for years without much thought to the environment, and developed into a real mess. After the public had become alarmed about strip mining, the company, to its credit, began to employ proper practises. When their present long term plans are completed the Wabamun area will be left in quite an acceptable condition. The present situation there is very bad, but that is the result of earlier very poor planning. That poor planning should not be repeated in future mines on the plains.

Let us leave the plains for now and move to the mountains. In the mountains it is much more difficult to protect the environment, however a simple technique was developed in Kentucky, and is effective. It is called the slope reduction technique and should be employed in western Canada. The slope reduction technique (9) requires removing the trees in advance, and smoothing out the overburden a little so that it is not at an unstable angle. The overburden is then sprayed by a hydroseeder with a fertilizer and seed mixture, and the result is often nice hiking paths (10). Even with these techniques, not all problems could be solved, and in certain areas of Kentucky strip mining just is not allowed.

The coal companies in Kentucky fought the new law bitterly; as did their political arm, -- the Mining Department. They claimed that the damage was negligible, the new law was unnecessary, and that it would drive them out of business. This is precisely what is done and said by the mining industry in Alberta and British - Columbia. The fact was in Kentucky, however, that coal production increased by seven per cent in the year following the introduction of the new law. The cost of proper reclamation did not harm the industry, being only about two cents per ton of coal mined. It could be done simply if it was planned in advance, whereas it usually could not be done at all if left until later.

It is ironic that the coal companies here are playing Alberta and B.C. off against each other. The two provinces have competed with each other to encourage new mines, by offering the companies better deals, like building roads or railways for them. In the same sense the Japanese coal importers are playing off Canada and Australia against each other by threatening to import from the other country. Meanwhile the environment and future generations suffer.

Let us look at mountain strip mining Canadian-style. Grassy mountain, near Blairmore in the Crows Nest Pass was strip mined by a French company called West Canadian Collieries, and abandoned in the 1950's. (11). They cut a gouge up the hillside, cut roads back and forth, and dumped overburden and slag coal down the hillside. The company that created this mess is no longer in the coal business in western Canada and has sold its assets to another that is considering re-working the mine. Another strip mine in the Crows Nest Pass is the Adanac mine, also operated by West Canadian Collieries. This was also operated with total disregard for the environment. A photograph taken in 1960, about nine years after abandonment, shows no significant vegetation (12). Another photograph taken in 1971, fully 20 years after abandonment, still shows no significant growth. From the point of view of the present inhabitants of Alberta, the damage from these strip mines is permanent.

The Adanac mine has been a blight on the landscape for nearly twenty years, causing serious harm to our watershed. The mine is just a pimple compared to what the companies now propose to do along the foothills Belt. They must not be allowed to repeat these mistakes on a massive scale.

A practise that has been common up to now in mining in Alberta has been to use slag coal to build access roads. One such road (14) in the Panther River area west of Calgary was made by the Mitsubishi Corporation on land they worked in conjunction with Canadian Pacific. It can be seen that the part of the road constructed of coal does not re-vegetate.

The photos shown so far are of abandoned mines that operated in the 1950's and 1960's. But now we are in 1971, and things should be different. It is fair to say that mining practises have improved on the plains and there do not pose a serious threat to the environment. But mining practises have not changed much in the mountains, except for the mines to become immensely bigger. It is about the mountains that the environmentalists are worried.

In May of 1969 the Kaiser strip mine at Michel, B. C., was being prepared for working. The area was being cleared, and access roadways were being built. The slope reduction technique was not being used in road construction (15), and apparently now is not being used with overburden. In the roadways shown, the overburden was simply pushed down the hillside, onto trees and snow (16), and left at an unstable angle. In the spring thaw, and for many years to come, caving and slippage of these piles will put great amounts of material into the streams.

Since these photos were taken, Kaiser has gone into production and is mining actively. They have had great operational difficulties, and in efforts to solve them, have had little time or enthusiasm for protecting the environment. Kaiser does not yet operate mines in Alberta, but is typical of major companies who do. Kaiser gave a $5,000 scholarship to U. B. C. for a student to study re-vegetation of strip mines, and thereafter spent plenty more money advertising this fact. It should be pointed out that this scholarship is worth approximately the same as one tire on one of their big trucks.

The coal mining boom has indeed brought prosperity to the Fernie area. But it is damaging the recreational potential and water supply more than necessary. In the long run, these environmental damages may outweigh the benefits of the present mining boom to the people of British Columbia. They certainly will persist after the mining companies have moved on.

Numerous companies have plans for coal mines in the mountains of Alberta, and they now are doing extensive exploration. Often this exploration is as damaging as a mine. Caterpillars are used to cut trenches up and down the mountains, and the overburden is pushed downthe hillside (17). Attempts are sometimes made to fill in the scars, but it is generally recognized that on steep slopes this cannot be done without some sort of dragline to pull the earth back uphill. Above timberline, nature heals her scars slowly (18) and these roads will persist as scars for many generations. The trenching here (17,18) was done by a company that goes under the name of Meadowlark Farms, but is a subsidiary of Ayrshire Coal Company. The parent is one of the biggest coal mining companies operating in the eastern U. S. A.

Much knowledge is available on how to minimize the harm of mountain strip mining. We must begin to get it applied here in western Canada. There are only two groups to deal with here in Alberta; the companies that do the mining, and the provincial government that controls it. In Alberta, certain companies have indicated that they want to be reasonable, and will accept firm guidelines, if they are clear.

Two things are absolutely essential to control strip mining properly, and in Alberta, neither is now the case. First, the control of reclamation must not be left in the hands of the Dept. of Mines and Minerals, because it has no interest in reclamation. The objective of that department is to increase mineral production and it naturally allows companies to do excessive environmental damage in order to increase that mineral production. So, we must take the control out of the Dept. of Mines and Minerals, and put it in the hands of a government department that has some interest in conservation.

Secondly, the companies must be required to submit for approval prior to mining, a complete reclamation plan. It is often stated by spokesmen for the Dept. of Mines and Minerals that poor strip mining practises are a thing of the past, that can be seen only in mines now abandoned. This is wrong, for they persist today. This photograph (19) was taken on May 12, 1969, at a mine operated by Coleman Collieries. The single worst practise in strip mining in the mountains of Alberta is the dumping of overburden mixed with coal down hillsides and leaving it at an unstable angle, and that is exactly what was being done.

Alberta has certain antiquated laws, particularly in the Right of Entry Arbitration Act, which is the real bane of conservationists. It is an Act under the Dept. of Mines and Minerals, by means of which a mining or oil company can have the conservation regulations of the Dept. of Lands and Forests overruled. This law should be eliminated immediately.

It is time to analyze carefully how strip mining fits into the future we want for the children of Alberta. It has been said that it is good for the people of Alberta because it creates jobs. It may not be worth the few jobs it creates. The day I was at the Coleman Collieries Mine and took this photograph (20) there were only four men there, each operating a machine. Three can be seen in the photograph, and the fourth, a driller, was nearby. Probably strip mining should be banned from the mountains altogether. Unfortunately, these hearings have not been empowered even to discuss that possibility for it was stated in the prospectus that strip mining will continue to increase in Alberta. We environmentalists have been told that strip mining will increase, and we accept that, albeit unhappily. We have been forced to compromise. We ask then, that the exploiters please compromise with us.

First, we ask you to pause and not rush headlong into exploitation and exploration in the entire mountain belt. Instead, let us separate the coal bearing areas of the mountainous belt into two categories of equal size, mining areas, and reserve areas where coal mining is banned for 15 years. Mining could take place in areas of the first category, and in fact total tonnage could increase. These broadly speaking, should be in the areas where it already has taken place, the accessible areas in and near the mountain passes, where there are already rail lines and towns that are dependent upon mining. Some of the abandoned mines should be re-opened, such as the one at Cadomin (21) that is over four miles long and only a few hundred feet wide.

Between the mining areas would be the less accessible areas that are now unspoiled and that would be set aside as temporary reserves. At the end of 15 years we would be able to appraise the effects of these huge mines on the environment, and then be able to make intelligent decisions on what to do with the reserve areas. If we indeed have the vast reserves of coal that it is claimed, then one-half of our mountainous areas should quite adequately satisfy the demand of the next 15 years.

Secondly, let us establish some proper laws that will protect our environment in those areas where mining is allowed.

Prepared by J. M. Kerr, Ph. D., P. Geol. for STOP (Save Tomorrow, Oppose Pollution), Edmonton and SPEC (Society for Pollution and Environmental Control), Calgary.

The slides referred to in this submission were retained by Dr. Kerr.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

Would you elaborate on area selection recommendation that you have. In the mountain sites, do you think it should be a site selection principle, or an area selection principle, or both?

DR. J. WILLIAM KERR

I suggest a combination of those two systems. I would suggest that we set aside for the present as mining areas those areas which already have mining in them such as the Crowsnest Pass, Banff Corridor, the region around Luscar and Hinton, and the region up at Grande Cache. Where there is no mining now leave it for 15 years. In those regions where mining is allowed, a site selection basis should be used.

DR. STUART SMITH

In your examination of the mountainous areas and particularly the newer areas, what is your assessment of the effect of the actual mine as compared to exploration that has taken place to develop that mine.

DR. WILLIAM KERR

It is hard to state categorically because it varies so greatly. In some regions where it is complex geologically, exploration is more damaging than mining. Wher it is simple the exploration is not that damaging.

4.5 CANMORE MINES LTD.

PRESENTED BY H. G. STEPHENSON

My Company, The Canmore Mines, Limited, is operating underground and surface mines in the Upper Bow Valley. The Company employs 250 people of whom 244 or 98% are Canadians.

My position is Assistant General Manager and I am responsible for the Planning and Engineering of our mining and reclamation work. My qualifications for presenting this brief include:

a) An Honors degree in mining
b) Membership of the Canadian Institute of Mining and Metallurgy.
c) Professional Engineer - Province of Alberta
d) Twenty years experience of mining including eleven years of strip mining in Great Britain, India, Turkey, Greece and Alberta.
e) President of the Upper Bow Valley Fish and Game Association and owner of a home in the Town of Canmore.

My company is operating a strip mine on the lower slopes of Mt. Rundle. My brief will prove to you that we have taken every possible precaution to ensure that no damage is done to the area and that the changes resulting from mining and reclamation will not detract from the beauty of the landscape. In fact these changes will provide amenities which do not at present exist.

DESCRIPTION OF MINE

This mine is operating on Crown land to which Canmore Mines has held leases for over 60 years. The applications made to the Alberta Government for permission to strip mine were extremely detailed and resulted in negotiations which continued for 5 months with 7 different Government Departments. When a strip mining lease was granted it contained protective measures to prevent water pollution, air pollution or erosion and covered the timing and nature of reclamation measure. Many of the conditions laid down resulted from our own experience of mining and reclamation.

STRIP MINING AT CANMORE

Some photographs will help me to describe our activities at Canmore. The First photograph* shows you a strip mine when excavation has been completed. Not an attractive sight but within a few months this hole will be backfilled to create an area like this shown on the second photograph.*

This was once a hole 120' deep, 1200' long and 250' wide. After backfilling and contouring the area was seeded with a mixture of seven different grass seeds including some which will flower and some which are attractive to birds and wild game. The seed and fertilizer is then covered with 2" of straw and sprinkled lightly with asphalt to hold down the straw. This acts as a mulch, protecting the seed, conserving moisture and absorbing warmth from the sun.

The third photograph* shows the same area after seeding and mulching. We expect grass to have covered this area by next summer. We will then be planting clumps of trees and shrubs. The surface will be allowed to consolidate for two years and then a small stream will be used to form a lake in this valley. You will notice excavations on the left side of the photograph. This is a 4' bed of sand which is being dug to spread on the edge of the valley. Eventually this will form a small sandy beach on the shore of the lake.

A fourth photograph* shows the layer of mulch pulled back to reveal the first shoots of grass appearing only two weeks after seeding.

The fifth photograph* shows the seeding and mulching operation in progress. The sixth shows an experimental area which was hand seeded in June this year and this photograph was taken a few weeks after seeding. In this case no mulching was done, on areas which have been mulched we expect to show much better results.

The contrast between this view and the appearance when this area was being mined is impressive. Already in addition to our seeding efforts Nature has added fourteen different varieties of wild flowers.

Photograph number seven*shows the road to the strip mine on Mount Rundle. You will notice how tidily the road has been made. No bulldozed trees, no trash left lying around. The road is compacted and oiled to prevent dust polluting the air.

The eighth photograph* shows the spoil heaps at the strip mine. Three seperate heaps are formed. To the right top soil excavated with great care and conserved for use during reclamation. Gravel forms the central heap and broken rock the left hand pile. During backfilling rock will be replaced first, followed by gravel, which will be smoothly contoured to an attractive, undulating slope flat enough to prevent erosion. Lastly top soil will be spread, seeding and mulching will be done, clumps of shrubs and trees will be planted and lakes could easily be created.

The ninth photograph*gives you an idea of the kind of timber which covers most of Mt. Rundle's lower slopes. Timber cleared for strip mining was either used for mine props in our underground mine or was given free of charge to the highways department and placed at camp sites all along the Bow Valley for use as firewood.

One of the aspects of strip mining which concerns everyone is the possibility of water pollution. Pollution of water can take two main forms. Dissolved solids which are dangerous to fish, plants or people and suspended solids which can, if present in sufficient quantity, settle on the bed of a stream or lake and kill the plants and water creatures by suffocating them. There is a mistaken notion that all mine water contains dangerous chemicals. This is not so. At Canmore we are extremely fortunate since analysis of several samples of our mine water has indicated that it is harmless, to quote the Water Pollution Branch of the Department of the Environment "The analysis indicates relatively good spring water. There should not be any concern for pollution from this mine discharge." Our mine water has a Ph value of 7 which means it is neither acidic or alkaline. This refers to water which flows from the underground workings, as far as water from the strip mine is concerne suspended solids, coal dust, silt, etc., could be dangerous if not removed. We have developed a system for removing these solids which has proven extremely effective. Water from the mine is drained into the recharge pond shown on this photograph.* This pond is sited in an area where the gravel is more than 50' thick, and is composed of a high percentage of large pebbly material.

The pond is dug approximately 60' long, 40' wide and 8' deep. The bottom of the completed pond is loosened by a ripper attachment on a bulldozer to increase the permeability of the gravel. Water from the mine is drained into this pond and immediately sinks through the gravel which filters all the sediment out of the water. We find such a pond far more effective than a simple settling pond from which water can overflow and carry solids with it.

The greatest depth of water which has ever accumulated has been 2' so the pond has plenty of capacity. The nearest stretch of river is 1 mile away so before the water can reach this it must filter through 1 mile of gravel and will be crystal clear. This stretch contains some very fine brown trout so we are taking particular care of it.

Lastly a photograph* showing Mt. Rundle. This is taken from Harvie Heights and shows you the very small cleared area occupied by the present mine. You might consider which spoils the view of Rundle the most, the strip mine or the highway with its fences and lamp standards in the foreground. The areas cleared for strip mining will, after reclamation, be even better than the grassy areas shown on a previous photo. They will cover less than 10% of the lower slopes of the mountain and will be irregular in shape. They will not detract from the appearance of Mt. Rundle and may well enchance it in the way the grassy slopes above the timberline do at present.

Now let us consider the ultimate effect of strip mining on the countryside in the Canmore area. Certainly there is a temporary disturbance of the surface. But at no time do we expect the area which is being mined to exceed 60 acres and reclamation will be under way on an additional 30 acres at the same time. Reclamation and mining will progress simultaneously.

WHEN RECLAMATION IS COMPLETED, WHAT IS THE RESULT

FIRSTLY an area completely covered by dense timber will be made even more attractive by a number of small grassy areas planted with clumps of trees and shrubs.

SECONDLY these grassy areas will provide valuable winter grazing for elk, deer and sheep. At present very few such areas exist in the Canmore district and as a result wildlife is quite scarce. The few animals remaining have become semi-tame due to increasing activity in the valley. Canmore Mines is, at present, arranging a wildlife survey on the mine property. This will be repeated in a few years time and hopefully the population of big game animals will have increased partly due to the increase in grazing areas.

THIRDLY firebreaks and roads will have been created in an area which is at present quite a serious fire hazard lying as it does close to and upwind of Canmore Town. A photograph already shown demonstrated the type of timber which covers the lower slopes and this type of timber does present a considerable fire risk. If Mt. Rundle's lower slopes were denuded by forest fire the scenic value of the mountain would be greatly diminished for many years. The roads prepared to allow strip mining will allow quick access in the case of forest fire. Forestry officers feel this is a distinct advantage in forest fire control.

FOURTHLY it will be quite easy to create one or more small lakes in the area using groundwater which filters down from the mountain to fill areas which have been mined and backfilled. These lakes will be surrounded by grassy areas and sheltered by trees so they will in years t come form a very beautiful recreation area. It is worth mentioning that we have set aside 35 cents per ton or $1,750 per acre for reclamation on Mt. Rundle. This is 40% more than we have found necessary on the reclamation work we have done so far and of which you have seen examples. This amount covers backfilling, contouring, seeding, mulching and tree planting.

It is worth noting that in the Upper Bow Valley between Exshaw and the Park Boundary the total area disturbed by industry and highways is approximately 2200 acres. Of this only 210 acres, less than 10% has been disturbed by strip mining for coal. Of the area disturbed by strip mining 72% has been backfilled and contoured and 40% of this has been seeded.

THESE THEN ARE THE PHYSICAL EFFECTS OF STRIP MINING ON THE COUNTRYSIDE. WHAT ABOUT THE ECONOMIC ASPECTS, THE TRADE GENERATED BY THE MINING INDUSTRY, THE NUMBER OF PEOPLE EMPLOYED, THE DOLLARS INFUSED INTO THE ECONOMY.

FIRSTLY the financial advantages to the province of strip mining at Canmore. One reference to our strip mine said that the only benefit to the province is 10 cents a ton royalties. In addition we must also make lease payments and Canmore Mines has paid $75,000 in lease rentals over the period these leases on Mt. Rundle have been held without mining any coal. This is in addition to the royalty payments.

Direct payrolls arising from our mining operations will be in excess of 2-1/2 million dollars this year. A large part of this is paid in income taxes to both federal and provincial governments. What is left after taxes is spent mainly within the province generating trade of all kinds.

Canmore is a town with a population of 2,000 people of whom about 500 are employed full time. Of these 500 half are employed by Canmore Mines. The other half are employed in service industries: shops, gas stations, motels, etc. which are dependant on the mine employees for a large portion of their business.

Of course all of the 250 people employed by Canmore Mines are not employed in surface mining. However, our company can only operate economically at a high output level and that level can only be achieved by a combination of strip and underground mining. We have contracts to supply coking coal to Japan and the coal on Mt. Rundle is our only known source of coking coals. Due to the very complex geology most of this coal can only be mined by underground methods. We will be dependant on strip mining for at least 5 - 10 years. After this all our strip mining reserves will have been exhausted and we must have developed underground reserves and methods to enable us to carry on by underground methods only.

If strip mining has to be stopped Canmore Mines would be forced to close down its operations and Canmore becomes a ghost town. Creating additional employment through tourism and recreation is not a solution. Tourism and recreation can not support the population of Canmore. With unemployment already at a tragically high level we cannot risk any mine closures.

Canmore Mines has been mining coal in the Canmore corridor for 85 years without either interferance or nuisance to the general public or the community. Only 20 years ago the Company returned to the Federal Government 1000 acres of surface and mineral rights for incorporation within the Banff National Park because mining within the park was not in the public interest. The price asked and received for this land - only $25.00 per acre.

With respect to the proposed legislation relative to The Department of the Environment we are aware of the increasing alertness of the public to adequate reclamation of surface mines but we would also suggest that in our opinion the awareness to this problem has arisen after adequate regulations have been enforced to prevent future desecration of recreation and other lands.

The restrictions and regulations which have been placed on the Canmore Mines, Limited with respect to its current surface mine operation on Mt. Rundle should more than adequately establish this and generally this area when reclamation has been completed will be a more useful and beneficial area than was the case prior to commencement of the surface mine operation.

We have considered the proposed legislation and will comment only on certain provisions which affect our operations.

With regard to Proviso 2.06 entitled Public Hearings on Environmental Matters we must agree with the philosophy that the public should be entitled, if they desire, to attend public hearings where the interest of the public are directly involved.

However, it is difficult to accept that any business or corporation could manage its affairs in a progressive and industrious manner if prior to proceeding on any major project the feasibility and economic results of its projects were to be reviewed by the public at large.

There must be a position of equilibrium where the development of natural resources can be pursued in both an economical and environmental fashion beneficial to both respects to the people of the Province of Alberta. It is respectfully submitted that when a decision is made with respect to pursuing the development generally of economic resources it would be hoped that each particular project or phase or variation thereof would not require public debate or public hearing.

The most important aspect of the proposed legislation is of course Proviso No. 4.0 which is entitled Principles Included in the Proposed Legislation which in essence incorporates the right of expropriation of both the surface interest and the mineral interest which any Company or person may acquire.

This, of course, is a definite deterrent to the development of the coal industry in the Province of Alberta. It is in direct contrast to the rights which are given by Statute to the oil and gas companies to enter land regardless of ownership for the purpose of developing their mineral interest.

It is now proposed that companies which control a mineral or surface interest will have to develop their resources on a conditional basis not at any time aware of whether or not they are going to have their interest abruptly taken away in the surface or in the minerals or both.

It is respectfully submitted that as a result of the threat of such proceedings long range plans of any coal company cannot be either formulated or pursued. It is tantamount to any business being under the threat of expropriation or government takeover.

If it is the intention of the Province of Alberta to encourage resource development and to encourage the growth of business generally and the coal industry particularly then it would seem feasible that the only reasonable type of legislation in a form such as this should provide that if a company or coal mining operation has directly failed to comply with the regulations as prescribed by the government from time to time for the development of this industry then its interest in the minerals and lands it owns would be subject to expropriation. This would be some assurance to a Company that for so long as they comply with the regulations as may be prescribed from time to time by the appropriate department of the government the expropriation of their mineral interests and surface rights would not occur.

With regard to this aspect of the proposed legislation there is one other matter which is of integral importance to a Company. That is the use made of the lands after any appropriate mining has been completed whether this may be underground or surface mining. A company subject to the compliance with the various zoning and planning regulations as prescribed from time to time may wish to develop its land to the use which they best deem fit. It may be that some form of coal mining may be done on the basis that the use of the land after the mining has been completed will also be of considerable value to the Company and without this secondary purpose the mining might not be pursued.

This legislation now of course puts a Company in the position where their long range plans for its land holdings can be terminated at any time upon the decision of the government should they proceed to expropriate the interests of the Company. Accordingly this would limit marginal mining activity where secondary purpose would have been of importance.

With respect to paragraph 4.07 Reclamation it is respectfully submitted by the Company that reclamation of disturbed lands is not always possible simultaneously with the operations of an existing surface mine. As a surface mine progresses past its minimum size in order that new reserves may be tapped, then of course, it is possible to simultaneously proceed with reclamation, but not until the operation has shifted from its original base. Legislation imposing an obligation to proceed with reclamation within a certain number of days after completion of removal of the reserves is a possibility but not the provision as it now stands.

With respect to 4.08 Regulations it has been submitted for some time that unfortunately the coal industry has received more than its share of criticism for reclamation work in the past and it is respectfully submitted that a regulation or legislation that enforces reclamation for all forms of development including road construction or power line facilities should also be enforced so that the legislation is not discriminatory against any particular industry.

With respect to provision 4.12 Security Deposit we would recommend that it would include a form of security other than cash so that interest could be earned by the depositor during the course of time that the money has been retained.

It is also respectfully submitted that some form of legislation should be introduced wherein the regulation and procedure prescribed for applying for permission to surface mine or underground mine should in fact be set forth by one department and all consents which are necessary should be granted by one department with the assistance or co-operation of the many other government departments required.

To summarize our main points we feel that strip mining with conscientious reclamation can proceed even in areas of great natural beauty without damage to the countryside. The disturbance is temporary and the final result can be that recreational facilities are created. In no case has our company shown any lack of concern for the environment in fact the opposite is true. Visitors to our property have included cabinet ministers, government officials, reporters, members of your authority, high school students and environmental groups. The reaction of almost all of these groups has been favorable. I think I am correct in saying that all of them left with a better understanding of our position.

It has been said that our actions during the next decade or so will decide whether the earth continues to be a habitable planet. One writer commented that at a time when man has reached the moon, has conquered Everest and has explored the furthest corners of the earth the greatest challenge of all waits for us at the city garbage dump. If this is true the mining industry and conservation groups clearly have a part to play. Conservationists have rendered a great service to humanity by bringing attention to the dangers which face the human race. But they must realize that many of us in the industry are conservationists too. We weren't 10 years ago because the problem of the environment was only just becoming clear. I suggest that the time has come for a truce between the conservationists and the mining industry. Cooperation between them will bring results. A civil war in which each side heaps abuse on the other will not.

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* The Photographs are not published with the proceedings, but are available in the Information Centre of the Environment Conservation Authority.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

There is a great deal of difference in the techniques that are used to strip mine and then to reclaim. Would you elaborate on the management techniques that you use in any of these over-all operations?

MR. H.G. STEPHENSON

Working with me, are five young men who are in charge of the drilling operations, and defining the geology of the area. Together we plan our opening up procedures. From the very start we take into account the final result of strip mining and the reclamation procedures we have to develop. We put forward our theoretical plans to the operational side of the company and they discuss them with us to see if our plans are practical. We then submit them to the government and we go through the present procedures for opening up a strip mine. It is a three-stage procedure in which we get permission first for prospecting; then permission in principle from the government to operate our mine, and then we submit detailed plans of the mine itself and the reclamation procedures that have to take place afterwards. When approved we go ahead with the strip mine. We have a mine manager at the strip mine, two foremen, and a special foreman for reclamation. The reclamation foreman is employed on reclamation for six months only because of the climate. The strip mine is surveyed once a week and we keep a constant record of the material excavated, where it is going to be placed as we place in the best possible position for back-filling. We keep a record of our reclamation procedures which shows us at any one time the total area we have disturbed, the area we have reclaimed, and the area remaining to be reclaimed. The purpose of this is to ensure that our operations and our reclamation is at least keeping pace and if possible gaining on the amount of land that we are disturbing.

DR. WALTER TROST

Are there sites that are strippable in the mountains in which the kind of reclamation that you have described can be done only with difficulty or risk?

MR. H.G. STEPHENSON

There are definitely sites which contain coal that could not be reclaimed satisfactorily and therefore will not be strip mined. There are sites where it will be a little more difficult and these we would consider for mining. There are also sites where in fact it is much easier.

DR. WALTER TROST

In those sites that are strippable but in which reclamation is too difficult those sites would not be mined?

MR. H.G. STEPHENSON

There are two sites I can think of where there is coal but will not be strip mined because we could not carry out the reclamation procedures.

DR. WALTER TROST

If strip mining were not possible for your colliery right now your whole operation would have to be closed?

MR. H.G. STEPHENSON

Correct, yes.

DR. WALTER TROST

Why is that?

MR. H.G. STEPHENSON

The total production from our mines at the moment is running 360,000 tons a year. We had expected to be producing half a million tons but due to the very extensive softening of the coal market we've had to reduce our tonnage. We have not been able to reduce our costs. Out of the 360,000 tons we intend to produce this year, about 110,000 tons will be from strip mining and both the strip mining coal and the underground coal must carry its share of the overhead. The overhead includes depreciation, interest charges, washing facilities at the mine, supervision, administration and so on. These can be said to constitute probably 40% of the total cost of producing a ton of coal. The burden that strip mining coal carries of the total cost could be as much as 40%.

DR. WALTER TROST

It is the profit on balance that is the problem?

MR. H.G. STEPHENSON

Yes.

DR. WALTER TROST

Is it your view that ultimately underground mining might re-emerge as the principal way of getting coal from the mountains?

MR. H.G. STEPHENSON

If there still is a coal industry in Alberta in ten years' time, certainly the major proportion of the coal will be produced by underground methods because by then all or a large proportion of the stip mined coal will have been worked out. Strip mining is a short-term experience which has to be adopted because of the low price on coal and developing underground mines and techniques for the very difficult geological conditions that exist in the Rocky Mountains would take a long time. We have an underground mine which is operating reasonably well in fairly good conditions but after we have worked out all the easy coal, we will have to tackle the more difficult coal at 40° - 50° at great depths over 2,000 feet which we are not technically capable of tackling. Techniques will be developed over the next ten years so that that underground coal can become an economic reserve which would replace the strip mine coal.

DR. WALTER TROST

As technology changes, sometimes what was impossible at one time becomes possible later on. May it be that later on a secondary recovery could be achieved from a surface mining approach? The other side of the question is; can surface mining techniques now affect the way in which underground mining can get the residual deposits?

MR. H.G. STEPHENSON

You could operate a strip mine at a ratio of four yards of overburden to one ton of coal and at the moment that may be the maximum you can work economically. You work the mine, reclaim it, back-fill it, and then in ten years time you might find that techniques have progressed so that you can work at higher ratios.

That same coal however could be worked at higher ratios in underground development and in my opinion we are more likely to progress with improving techniques in underground mining. Having worked a strip mine along the outcrop of the seam, if that seam is continuous, there is nothing to stop us from leaving in a coal seal along the bottem edge of the strip mine for an underground mine on the dip side. I have done this in India without any danger to the men and it worked quite successfully. I am sure it could be done here.

DR. WALTER TROST

So that in fact the two aspects of the question could be worked out in one management problem?

MR. H.G. STEPHENSON

Right.

DR. WALTER TROST

What is the time interval that you found in practice between opening a reasonably sized pit and finally reclaiming it?

MR. H.G. STEPHENSON

On one of our strip mines the time between opening that mine and seeding it was only five months. It was a very small strip mine and only produced 16,000 tons of coal. Another area took a year and a half to work out the coal, about a year to back-fill and about two months to seed with a total time period approaching three years. On Mt. Rundle I would say three years from starting the mine to getting the grass seed on would be a reasonable figure. It would take three to five years on a mine with reserves of two or three million tons as compared to our reserves of 150,000 tons.

MR. PAUL BABEY

You mentioned that the company is setting aside 35¢ a ton and about $1750.00 per acre for reclamation and that in fact up until now you were spending about 60% of this. Your actual cost of reclamation in that area is around .21¢ a ton or something slightly over $1,000.00 per acre. Is that right?

MR. H.G. STEPHENSON

Actually, .25¢ a ton is what we have had to spend so far on reclamation and we have set aside .35¢ on the next strip mine.

MR. PAUL BABEY

Does this include the cost of separating the overburden and replacing the topsoil as well?

MR. H.G. STEPHENSON

It includes the cost of back-filling the overburden separately but the overburden is separated during the mining process and that separation is not part of this cost

MR. H.G. STEPHENSON

In a couple of cases the topsoil was so thin that we couldn't take it off satisfactorily and we had to import a peaty soil from another place on the mine property, truck it over to the mine site and spread it with a bulldozer in order to obtain some organic matter for seed to take root in.

MR. PAUL BABEY

You are spending 60% of your set-aside. Any plans for the unspent 40%?

MR. H.G. STEPHENSON

Frankly, the reason we set aside more in this case is because of the steeper slopes on Mt. Rundle. It will take more money to reclaim the Mt. Rundle mine than any of the mines we have operated so far. We are quite confident we can do it for the .35¢.

DR. STUART SMITH

When you are involved in reclamation you spend a considerable amount of time with your own labor force in discussing the problems. Could you give us some assessment of whether this has been successful in increasing your reclamation costs and keeping your costs within a reasonable level through the attitude of your men?

MR. H.G. STEPHENSON

Quite definitely it has. The strip mine foreman has spent most of his life in the bush cutting timber, operating with lumber companies and therefore understands the kind of work we were doing. Employed on the reclamation process is a young fellow who had just received a B.Sc. in Zoology from the University of Alberta, a local fellow from Canmore, 21 years old, very enthusiastic about hunting and fishing and a third fellow who had worked on the farms in England, operating the different types of agricultural machinery. It is quite an asset to have these fellows working for us.

Your file Votre dossier

Environment Canada Environnement Canada

Our file Notre dossier

Northern Forest Research Centre
Canadian Forestry Service
5320--122 Street
Edmonton 70, Alberta

December 20, 1971

4.6

Dr. W. R. Trost, Chairman
Environment Conservation Authority
9912--107 Street
Edmonton, Alberta

Dear Dr. Trost:

I am pleased to submit herewith on behalf of Canada Department of the Environment a "Brief on the Environmental Impact and Regulation of Surface Mining in Alberta" for inclusion in your public hearings on this subject to be held in Calgary on December 21, 1971.

The brief is based upon submissions from the following services of Environment Canada:

(a) Canadian Forestry Service, Edmonton
(b) Canadian Wildlife Service, Edmonton
(c) Water Quality Division, Calgary and
    Water Planning and Operations, Regina
    Inland Waters Branch
(d) Environment Protection Service, Ottawa, and
(e) Fisheries Service, Central Region, Winnipeg.

Yours very truly,

M. H. Drinkwater,
Director

A. BASIC ECONOMIC ANALYSIS OF THE COAL MINING INDUSTRY IN ALBERTA

1. Resources and Markets

The Province of Alberta is richly endowed with coal resources. Most recent estimates[1] indicate that the province contains 47.2 billion short tons in place. Of this total, 5 percent or 2.2 billion tons are "measured" 68 percent or 32.1 billion tons "indicated" and 27 percent or 12.9 billion tons are "inferred" resources. Of total Western Canadian reserves Alberta alone accounts for 40 percent. Most of Alberta's coal resources are of bituminous and sub-bituminous rank. Resources of bituminous coal, much of which is of good coking quality, are located in the mountain and foothills region, whereas sub-bituminous coal deposits occur in the plains. Estimates indicate total bituminous and sub-bituminous reserves at 37.3 billion and 9.9 billion short tons, respectively.

The revival of the Alberta coal industry in recent years is directly attributable to the demand from two main markets: the Japanese steel industry and the thermal-electric industry. Four Alberta companies presently have contracts to export 4.3 million short tons of bituminous coal to Japan in 1971, and 5.4 million annually to 1975[2]. It can be expected, also, that some major industrialized countries presently faced with shortages of high quality coking coal will be looking for new sources of supply. Among these new sources will be Canada - and in particular Alberta. The National Energy Board of Canada has forecast coal production in Alberta to increase to 11.6 million short tons by 1975, and to 32.4 million short tons by 1990. This projected production for 1990 represents a five-fold increase over 1970 production. However, these figures predict that by 1990 less than 5 percent of Alberta's total coal reserves will have been tapped. Both resources and markets indicate therefore that the coal industry in Alberta will expand and remain viable for many years.

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[1] Latour, B.A. and Christmas, L.P. 1970. Preliminary estimate of measured coal resources in Western Canada. Paper #70-58, Dept. Energy, Mines and Resources, Ottawa.

[2] Christmas, L.P. 1970. Coal and Coke. Paper #14, Mineral Resources Branch, Dept. Energy, Mines and Resources, Ottawa.

2. Firms and Employment

Since the mid-60's the trend has been to larger but fewer mines. Only by shifting in this direction can the industry benefit from the economies of scale. In 1965, 44 mining companies were in operation; only 28 were in operation in 1970 (Table 1). Of those mines operating in 1970, six produced over 90 percent of total production. The large capital investments required to expand existing operations presents a formidable barrier to most smaller companies and, therefore, further decreases in the number of operating mines is likely. Although the coal mining industry, like the petroleum industry, is not labour intensive, it is anticipated that there will be a significant increase in primary employment as a result of production increases to meet future market demands. In the period 1965-70, for example, coal production increased by 97 percent while primary employment rose by roughly 50 percent. By 1975, primary employment in the industry could reach 4000 people[1].

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[1] Western Coal Operators Association.

3. Surface Mining Projections

Since 1965, approximately 70 percent of Alberta's coal production has been surface mined by open pit and strip mining methods. It can be expected that this method of recovery will continue. From the viewpoint of the mining industry, surface techniques offer real advantages:

a) they make possible the recovery of deposits which, for physical reasons cannot be mined by underground methods;

b) they provide safer working conditions;

c) they usually result in more complete recovery of the deposits; and

d) most significantly, they are cheaper in terms of unit costs.

Additionally, productivity per man-day is much greater than in underground mining (Table 1).

It has been estimated that approximately 7 square miles of land area have been disturbed by surface mining activities in Alberta to 1970. Surface mining in the mountain and foothill regions of Alberta had until recently disturbed less than 800 acres. Rough estimates of acreages to be surface mined over the next two decades, deduced from the National Energy Board forecasts, predict that by 1990, Alberta strip mining will occur at a rate of 2,200 acres annually. At least 32,000 acres could be strip mined for coal over the next 20 years in the foothills belt between the Crowsnest Pass and the Smoky River.

Table 1. RELATED SURFACE AND UNDERGROUND MINED COAL PRODUCTION STATISTICS FOR ALBERTA

YEAR	PRODUCTION			VALUATION AT THE MINE		NO. MINES IN OPERATION	AVERAGE NO. MEN EMPLOYED	AVERAGE OUTPUT PER MAN-DAY	
	SURFACE MINED	TOTAL COAL MINING	AMOUNT SURFACE MINED	TOTAL VALUATION	VALUE PER TON			SURFACE MINING	UNDERGROUND MINING
	000's tons		percent	dollars				tons	
1965	2,437	3,414	71	12,172,000	3.57	44	1,180	27.5	4.9
1966	2,426	3,467	70	12,067,000	3.48	37	1,150	31.9	5.2
1967	2,601	3,601	72	12,506,500	3.47	35	1,160	37.7	5.1
1968	2,988	3,925	76	12,597,200	3.20	30	1,100	47.8	5.0
1969	3,334	4,426	75	13,483,000	3.04	29	1,210	49.7	5.3
1970	4,735	6.783	69	26,710,500	3.93	28	1,760	46.4	7.9

Source: Alberta Department of Mines and Minerals

Canadian Minerals Yearbook
Mineral Resources Branch
Department of Energy, Mines and Resources
OTTAWA

4. Social Benefits

Albertan benefits are for the most part measured by direct and indirect employment opportunities, revenues generated for provincial and local governments, and the kilowatts of low cost electricity which provide a source of energy for homes and businesses. Table 2 denotes some of the values of these benefits.

Table 2.

SOME BENEFITS DERIVED FROM ALBERTA'S COAL MINING INDUSTRY

Year	No. Employed[1]	Salaries & Wages[1]	Provincial Income from Royalties and Leases[2]	Thermal-Electric Energy Generated
		dollars	dollars	million KWH
1965	1,181	5,732,620.	236,605.	1,800
1966	1,146	5,867,748.	258,420.	2,150
1967	1,162	6,101,263.	299,479.	2,200
1968	1,103	6,268,632.	421,730.	3,300
1969	1,209	8,308,628.	642,640.	3,800
1970	1,757	n.a.	652,188.	5,000
1971	-	-	1,640,885.	-

[1] in direct employment only

[2] ending March 31st of year indicated

Sources: Alberta Department of Mines and Minerals
Statistics Canada: Coal Mining Industry Cat. No. 26-206
Alberta Power Commission

Although employment opportunities are created by the presence of the coal mining industry and its related activities, it is not a labour intensive industry. In 1970, for example, direct employment in the industry constituted less than 1 percent of the total Alberta labour force. Introduction of an employment multiplier to determine the expansion effect does not increase the total numbers employed in other sectors of Alberta's economy significantly[1].

On the other hand, wages and salaries paid by operating companies, income accruing from royalties and leases, and tax payments have a direct impact on the province's economy. A portion of this money will be spent and respent within the Alberta economy, generating further income and labour demand.

The mining industry as a whole is capital intensive. It is recognized that a percentage of initial development outlays and annual operating expenditures are, and will continue to be, spent outside the province. These expenditures are primarily for large mobile equipment and their replacement parts which are not normally available from Albertan manufacturers. In this respect, Albertans will not receive the total benefits that would accrue if all capital outlays were spent within the province, they will be shared with other Canadians and North Americans.

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[1] A conservative estimate from several sources suggests a 1:1 ratio of direct to indirect employment within a mining community. The ratio would be slightly greater for the province as a whole.

Reclamation of areas disturbed by surface mining is itself an employment opportunity. Employment of students and contractors by mining companies to reclaim spoiled areas would help, to a certain degree, to reduce the employment problems of the summer months.

5. Social Costs

In transforming coal resources and other resources into economic wealth, Albertans have paid little attention to long-term environmental consequences. The very act of production associated with surface mining of coal generates a number of side effects or spillovers from the activity. It is these spillovers and their associated costs that are commanding immediate attention by the people of Alberta who should not be required to absorb these costs. Unlike benefits which can be described quantitatively, the external effects of surface mining are either intangible in value or not subject to direct measurement at present. In short, the resource user, not the public, should pay for damages occurring external to his basic activity. Like clean water or clean air, environmental goods such as scenery, undisturbed open space and the presence of wildlife are public goods and should be jealously guarded and protected by Albertans, and open to the enjoyment of everyone. Albertans must be careful which resources they give up or "trade-off" to industry in return for the benefits provided. Allocation of areas for industrial activity in combination with other land uses can be effectively determined by sound and unbiased planning which considers equally all resources, whether quantifiable in economic terms or not.

For the 12,235 square mile "Edson" region west of the Pembina River to Jasper National Park and north from the Brazeau River to the Smoky River, hunters spent 1.75 million dollars ($131.00 per square mile of Crown land) annually in the early 1960's[1]. The potential annual expenditure was slightly more than 4.0 million dollars ($333.00 per square mile). On the most productive "game" lands i.e. grassland and aspen, these values would be considerably greater per acre. The present and potential value of the fishing and trapping industries in the foothills may exceed the value of the above hunting industry.

External costs, whether social or economic, now face Albertans; these are, in part, the rationale for public regulations. Regulations for reclamation should therefore consider both the operating site and the disturbances that are created in the exploratory and development phases. Only by such regulations can industrial activity be made to serve and maximize the public interest.

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[1] Stelfox, J.G. 1965. The wildlife resource in C.D. 14 (Edson Region). Typescript report prepared for Resources for Rural Development in Census Division No. 14. Resource Study 800-884. 1, Farm Economics Branch, Alberta Dept. of Agriculture, Edmonton. 18 pp.

B. CO-ORDINATION OF SURFACE COAL MINING, ENVIRONMENTAL PROTECTION AND RECLAMATION.

1. Planning and Land-use Objectives

The key to successful reclamation is planning. Because it is not possible to conduct mining without some disturbance to the natural landscape, important questions in the planning are how much disturbance is to be tolerated and to whom is it important. The question of eliminating man-made environmental abnormalities is largely an economic one which can be answered by proper land-use planning.

One of the first questions to be asked in planning is what should be the reclamation goal. An undisturbed landscape? An aesthetic wasteland? A golf course? A park? Each alternative would find proponents and there is no goal that would satisfy everyone. To the purist there is no way to recreate an undisturbed landscape because the one that existed prior to mining evolved over thousands of years. The best that man could do would be to create an artificial imitation that superficially resembles the former landscape. On the other hand, it may be possible to create a more useful landscape. Reasonably flat or rolling terrain could be turned into a park, golf course or hiking-fishing area. Whatever the goal, it should be agreed upon and planned for prior to mining. The cost of achieving that goal must be anticipated and the responsibility for meeting it assigned on a rational basis.

Before there is any development for coal or other minerals in a particular region it should be determined whether there is some other over-riding land-use for which the area is better suited, and whether that use would preclude or limit surface disturbances. An obvious example of a land-use that would preclude surface disturbance would be land already reserved for parks because of its unique qualities. Land that has high recreational and watershed values because of its nearness to cities should likewise be reserved. Specific cases in Alberta would be the Pincher Creek-Waterton-Cardston triangle, the Elbow and Sheep drainages south-west of Calgary, and the Banff-Calgary, Jasper-Edson, and David Thompson transportation corridors to the national parks. In 1959 it would also have been possible to argue for a similar reservation in some portion of the Swan Hills of Alberta. These are examples of areas that should be considered for designation as a "Restricted Development Area" under the terms of the Department of the Environment Act.

All land is watershed and to some degree aesthetic and most lands support wildlife. Some land contains fish habitat and some has commercial value for timber or agricultural crops. In the development of the land-use plan and in the designation of "land management zones" it is necessary to ask what land resources are used now. Are they likely to be used in the future? Will the improved access that accompanies development result in new uses that are not present now? Will the disturbed area be visible from roads and other developments not directly connected with the mining activity? Is the area surrounding the land to be disturbed, already developing according to an existing plan? All of these considerations must influence planning for reclamation. The need for planning, land-use zoning, and pre-determination of environmental policies and goals form the central rationale for the legislative recommendations in this brief.

2. Water and Aesthetic Management

Ground water flow patterns can be disrupted by strip mining. This disruption is particularly important in the mountainous source areas of the Saskatchewan, Smoky and Athabasca rivers of Alberta because very little overland flow occurs in these vegetated land areas. Most flow into these rivers originates as local or regional groundwater. Local groundwater systems recharge and discharge within the same catchment. Removal of the overburden from either the recharge or intervening transmission zone may alter the pre-existing streamflow regime.

Regional groundwater flow occurs across catchment topographic boundaries. Often the same recharge zones feed both local and regional groundwater systems, although the valley bottoms may also act as recharge zones for regional groundwater. Deep cuts made during surface mining generally encountered one or more groundwater flow systems and disrupt their normal flow patterns. It is not likely that reclamation measures can restore these disruptions. Seemingly minor land areas may have importance to the groundwater flow system far out of proportion to their size. Groundwater flow patterns are in general perpendicular to the foothills; coal seams are parallel. Removing the overburden along the contour, therefore interrupts groundwater flow along a line that generally separates aquifers from their recharge areas. If extensive and contiguous areas of coal in the foothills are mined, serious shortages of groundwater in the adjacent plains could occur. Because pre-mining groundwater flow patterns can not be expected to reoccur after reclamation, these alterations should be considered as irreversible in the foothills and mountain areas.

Interrupted groundwater flow systems result in surface impoundment and flow. This impounded water must be removed during mining operations, and can cause erosion problems in small streams draining the area, if the water is added to them at a rate that increases their instantaneous peak discharge by more than 5 to 10 percent. Impoundment may also provide either a flood control or a flooding problem for downstream users. Impoundment of normal flow in small streams behind road crossings or other damming structures, whether permanent or temporary, alters the aquatic environment of the stream below the point of interruption. This has serious consequences for fish that may migrate up the stream or utilize it as a spawning and feeding ground. Once normal stream regimes are altered, each further release or impoundment must be governed by its effect on this newly established regime. Over a long period of time, downstream development may occur that precludes the desirability of re-establishing the pre-mining water regime. Reclamation plans must consider alternative regimes in this case.

The magnitudes and therefore the impact of the effects of surface mining on groundwater patterns, stream flow volumes, or stream flow regimes can not be generally predicted. Each situation must be evaluated individually. For example, the infiltration capacity of spoil material is often greater than that of the undisturbed land. High infiltration and storage reduces the instantaneous peak magnitude and flow volumes in streams during rain storms. However, rapid transit through porous overburden coupled with low storage retention can produce the opposite effect. Therefore, any alteration to the normal surface or subsurface drainage patterns should be considered as detrimental until the details of such disturbances have been evaluated on site, for each affected aquifer, and for channelized flow downstream. This evaluation should take place before mining starts within the concepts of overall water use.

Both physical and chemical water quality will be affected by strip mining. Groundwater flow forced to the surface can carry solid particulate matter overland into a stream. Local deposition of the sediment will affect fish spawning and feeding beds and aesthetics. Further downstream, suspended material entering reservoirs designed for flood control or power generation will accumulate and reduce their storage capacity. Sedimentation can be minimized by planning for siltation ponds prior to stream entry.

Chemical water quality will be changed because of new flow pathways. The effect and magnitude of change is impossible to predict without a thorough knowledge of the surface and groundwater hydrology of the disturbed area. Changes may be beneficial, harmful or neutral. A program of overburden and drill core analysis to determine if substances which would adversely affect water quality will be released upon weathering could prevent problems. Any regulation of flow reduces the aesthetic quality of mountain streams, and increases of sediment and hardening chemicals, increase the water treatment costs of municipal water supplies.

3. Wildlife Management

Coal-bearing areas include lands that support aspen and/or grassland vegetation. In western Alberta these are productive and critical ranges for numerous big game and upland game bird species as well as many equally important non-game species. Notable of the "game" species are mule deer, elk, bighorn sheep, ruffed and sharp-tailed grouse and to a lesser extent mountain goats, caribou, moose, white-tailed deer, Franklins and blue grouse, and white-tailed ptarmigan. The streams and lakes of western Alberta abound in a rich and varied aquatic fauna including a diverse and abundant fish population. Numerous fur-bearing species are located within the coal-belt as well as several rare and endangered wildlife species such as the mountain caribou, mountain goat, bighorn sheep, wolf, grizzly and cougar[1] [2]. A 3,000 square mile area between the Brazeau and Smoky rivers supports some 2,900 moose, 2,600 deer, 2,500 elk, 2,200 bighorn sheep, 550 mountain goats, 600 caribou, 180 grizzly, 500 black bear and numerous other valuable non-game wildlife species. The critical nature of the grassland and aspen communities for survival of wildlife in the mountains can be appreciated when we realize that during the seven-month winter period in the mountains (mid-Oct. to mid-May) the wild ungulates are forced to winter on 10 percent or less of the total mountainous area, with many winter ranges supporting wild ungulate densities of 25 to 100 animals per square mile of range. Open grasslands and aspen pastures comprise over 75 percent of this confined winter range[1,2]. In total, the foothills and mountain region provide the diversity of habitats resulting from variations in altitude, exposure, soil and plant cover, that is required to support an abundant and diverse animal population.

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[1] Boag, D.A. and W.G. Evans. 1967. Mountain habitats--in Alberta a Natural History, edited by W.G. Hardy. M.G. Hurtig Booksellers Ltd., Edmonton, Alberta.

[2] Stelfox, J.G. and R.D. Taber. 1969. Big game in the Northern Rocky Mountains coniferous forest--IN 1968 Symposium of Coniferous Forests of the Northern Rocky Mountains, edited by R.D. Taber. Center for Natural Resources, Univ. of Montana Foundation, Missoula, Montana.

Recent studies[3] of coal mining operations in the foothills and mountains of Alberta and B.C. have shown several cases where operations were deleterious to both wildlife populations and their habitats. One report documents four areas in western Alberta where serious damage has occurred. New developments in the Racehorse Creek, Coal Branch, Red Deer Valley

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[1] Stelfox, J.G. and R.D. Taber. 1969. Big game in the Northern Rocky Mountain coniferous forest-- IN 1968 Symposium of Coniferous Forests of the Northern Rocky Mountains, edited by R.D. Taber. Center for Natural Resources, Univ. of Montana Foundation, Missoula, Montana.

[2] Cowan, I. McT. 1950. Some vital statistics of big game on overstocked mountain range. 15th N.A. Wildlife Conference (1950), pp. 581-588.

[3] Kerr, J.W., L. Hamill, A.L. Harris and N.W. Rutter. 1969. Coal Mining Damage in Alberta.

and Smoky River areas are expected to pose serious problems to the wildlife resource. Mining sites in the Smoky River and Coal Branch areas lie in the heart of critical wild ungulate winter ranges. Mountainous ranges adjacent to Jasper, Banff and Waterton Lakes National Parks play a major role in providing the necessary winter range for wild ungulates which migrate each fall from the Parks to winter on the productive provincial winter ranges.

Wildlife and mining are not necessarily incompatible. The limestone quarry operation at Cadomin is an example of mining activities being reasonably compatible with the presence of bighorn sheep. Mining can be programmed to minimize the destruction of critical, wildlife habitat components, and to minimize harassment of wildlife populations. There is a dearth of knowledge on the extent and seriousness of the impact of surface mining upon wildlife populations and habitats. Research is required to document this impact and devise means of reducing it.

4. Environmental Impact Appraisal and Operational Research

Prior to mining in a given area an environmental impact statement should be supplied to the Government by the company stating the anticipated permanent or temporary damage to natural resources due to the operation, the time over which reduced environmental quality will exist in given areas and plans for environmental protection.

The environmental impact appraisal could be formulated as follows[1]:

(a) a statement of major objectives desired in the resource development project;

(b) an analysis of technological methods of achieving these project objectives;

(c) characteristics and conditions of the environment prior to the proposed development;

(d) possible deleterious changes in various characteristics of the ecosystem;

(e) an estimation of the magnitude and significance of these changes to the ecosystem;

(f) an assessment of the total impact, by analysis of separate impact events and ecological parameters; and

(g) a summation and recommendation.

The application of this concept to a typical mining operation would require an estimation of ecological changes due to the following project activities:

(a) construction of buildings and ancilliary facilities;

(b) construction of highways, railways, bridges and access roads;

(c) construction of transmission lines;

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[1] S.K. Krishnaswami, Environmental Protection Service, Department of the Environment; personal communication.

(d) blasting, drilling and related work;

(e) surface excavation and dumping;

(f) mineral processing and handling;

(g) slurry and other waste disposals; and

(h) spills and leaks.

Biological indicators of environmental quality are of considerable importance in determining the impact of a development. Changes in the density and productivity of aquatic and terrestrial plants, and changes in the health and distribution of fish and wildlife are early warning signs of environmental impact. The interpretation of physical and chemical measurements of environmental quality should be made in terms of these biological measurements and observations.

Operational research should obtain information on specific biological, chemical or physical techniques to prevent environmental damage and re-establish a suitable topography, stability and vegetation. In British Columbia, as a result of 1969 amendments to the Coal Mines Regulation Act and the Mines Regulation Act, all companies that are operating under the new legislation are engaged in reclamation studies of some kind[1] Requirements for industrial participation in impact studies and operational research in Alberta would hasten the development of environmental protection methods and reclamation.

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[1] J.V. Thirgood and J.R. Matthews, "Progress in reclamation research in British Columbia during 1970", Mines paper presented at 15th I.U.F.R.O. Congress, Gainsville, Florida, 1971.

Operational research would also tabulate the costs of reclamation as it evolves to meet future land-use objectives and allow the company to weigh these costs against the benefits from the extracted mineral.

5. Land Capability Analysis

Land capability analysis can be used as an aid to obtaining coordination of surface coal mining with environmental protection and reclamation. Such an analysis may have valuable application to the development of coal in western Canada, particularly in the Rocky Mountains and foothills areas.

Exploration for coal can be expensive. It would be most desirable if those exploring for coal knew in which areas"

(a) coal mining would be prohibited entirely because of other over-riding land uses that would preclude the surface disturbances necessary for open-pit operations;

(b) coal mining would require extremely high standards of care to protect adequately the environment in all phases of the mining activity and reclamation such that the cost would make operations either uneconomical or borderline;

(c) coal mining would not require great expenditures to protect the environment because it can be protected by a good standard of care in mining practice and reclamation; and

(d) coal mining would be the most valuable resource and the land is of relatively little value for purposes other than mining.

It is equally important, although not necessarily only in economic terms, for the government and the people of Alberta to know the value of the land upon which they may permit coal mining.

It would be unwiseto prohibit outright surface coal mining in large blocks of land without just and substantial reasons. However, there could be particular sections of land that have intrinsic values based on a combination of land uses such that to permit coal mining would be an unwise allocation of resources. Surrounding such sections may be land where very careful mining practices and expensive reclamation work would be necessary to protect the land.

In the past the cost of protecting the environment was not considered as one of the operating costs. Today, our laws require that the environment be taken into account. For example, the decision to allow tip dumping or not (as opposed to benching dumping) may determine whether or not an operation is economical. Unless guidelines as to what forms of dumping are permitted under certain conditions are made clear, a mining company cannot adequately evaluate the cost of environmental protection. A company should be able to include reasonably accurate figures for the cost of environmental protection in its feasibility studies at the same time other cost data are developed.

C. ENVIRONMENTAL PROTECTION DURING SURFACE EXPLORATION AND MINING FOR COAL

1. Water Quality Control

Since coal washeries and coal burning power plants require a supply of water, the larger coal mines are located on streams, rivers or lakes. A water quality monitoring and control program is therefore and integral part of environmental protection during these operations. All water courses that flow out of or through a mine site should be routinely monitored to determine downstream effects of the mining upon water and bottom quality. This becomes of increasing importance if changes in quality can effect the downstream or local use of the water for recreation, fish and wildlife, agriculture or human consumption. The water quality parameters most commonly altered by coal mining are suspended solids, turbidity, color, iron, manganese, organic carbon, nitrates, phosphates and alkalinity. The mass effect upon water quality of the weathering and leaching of minerals in large acerages of disturbed sandstone and shale has not been studied.

Because of the high pH's (7.5-8.5) and bicarbonate contents of most of the surface water in Alberta, the solubilities of inorganic ions such as iron and manganese are low, and if released, are soon oxidized and precipitated. A large part of the iron that enters streams appears to be derived from minerals contained in the overburden rather than the coal. Some elements such as iron and manganese appear to move in water largely in the particulate fraction rather than in true solution. Proper sediment and erosion control will therefore reduce the possibility of these elements being carried downstream. Other elements such as nitrogen and phosphorus move in solution for great distances. Since the control levels in Alberta[1] are much lower for manganese (0.05 ppm) and phosphate (0.15 ppm) than for iron (0.3 ppm) and nitrogen (1.0 ppm), these elements require more careful monitoring. Each water quality parameter therefore requires a monitoring and control program that takes into account its unique biological, chemical and physical nature.

To prevent pollution, coal wash water must be discharged to large clarification ponds to remove coal fines and other refuse material. These ponds should be designed to accommodate many years' accumulation. Preferably the clarified water from the slurry pond is reused for washing coal.

Algal blooms in streams and lakes can be used as water quality indicators since these normally occur in response to added nutrients (nitrates and phosphates) which are released from the soil and vegetation when it is disturbed. Such blooms have been observed in late summer in portions of foothills streams affected by sediment and drainage from surface coal mining operations. Small lakes are quite

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[1] Alberta Surface Water Quality Criteria

vulnerable to accelerated eutrophication and need protection from sediment and inorganic chemicals that can leach from the surrounding land when it is disturbed, become concentrated in the lake, and cause algal and aquatic plant blooms.

2. Sedimentation and Erosion Control

Sedimentation and erosion controls during surface mining operations have not been given serious enough consideration in Alberta. Surface water entering streams and lakes from mining areas should not increase the suspended solids concentration by more than 10 ppm above the background level[1]. Since most sediment transport occurs during rainstorms, physical water quality must be monitored at these times to determine if this criterion is met.

The control of mine drainage should begin prior to the overburden removal. When a new pit or field is opened, care must be taken to divert all surface streams around the "action centre of mining". Diversion ditches should be constructed above the highwall to prevent surface waters from entering the coal recovery excavation. Pumps should be installed to convey precipitation and infiltration from the excavation as rapidly as possible. Diversion ditches may also be used to remove water from the excavation. These drainage control measures are usually necessary for mine operation and thereby serve a dual purpose.

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[1] Alberta Surface Water Quality Criteria

The prime way of combatting soil erosion is by keeping the area of disturbed, unvegetated land to a minimum. This objective is accomplished both by planned mining and by rapid reclamation. Drainage control and sediment catch basins must be used until revegetation is completed. Physical and chemical treatments to control erosion and speed revegetation are also useful. Fish spawning grounds and bottom feeding grounds are particularly vulnerable to destruction by sediment in headwater areas of streams. If a stream cannot be adequately protected during the mining operation, then a commitment must be made to reclaim and probably restock it as part of the overall reclamation plan.

3. Salvage Operation and Road Construction

Prior to mining or overburden dumping, merchantable timber should be cleared leaving a clean edge to which revegetation can be tied. Where overburden is placed on steep, treed slopes, the stability of the dump can be reduced as the trees decay and produce a slippage surface. Clear-cutting with proper cleanup of the refuse leaves the land in the most suitable condition for mining, dumping or road construction. These salvage operations should be done before construction. A mixture of topsoil, roots, slash and small stumps should be salvaged and used to cover dumps or abandoned haul and access roads.

Haulage and access roads are usually built and located with less thought to the land disturbed than to the efficiency of the mining operation. Exploration parties are often the least cognizant of proper road construction since they only make short term use of the roads they build. However, these roads usually are apparent for many years after the exploration is completed unless they are reclaimed. A limited number of well built and maintained roads with culverts provide valuable access to a new area, but all other roads and exploration disturbances should be revegetated. Where necessary, backfilling, contouring or scarification should precede revegetation.

4. Overburden Management

The preferred technique for producing mass stability and a suitable topography of surface mined land is to backfill as many pits as possible with overburden from other areas. This technique has been more the exception than the rule in Alberta especially in rugged terrain and where pits are widely separated. Backfilling is planned overburden management; end-tipping rarely is.

If overburden dumps are required, they should be constructed like an earth dam, from the bottom up, rather than by end-tipping into a valley down a steep slope. When overburden is placed on the bottom first, it becomes compacted and settles as the dump increases in height thereby increasing its stability and reducing its volume. As material is added a bench or contour is left around the edge of the dump at about every 50 ft. of vertical lift. These benches are used to place topsoil and to hydroseed the slope below. Revegetation proceeds uphill as each lift is completed to keep the area of exposed overburden to a minimum.

This method of overburden management may be somewhat more expensive than end-tipping but it has many advantages from an environmental point of view.

Another way of handling overburden is end-tipping to the angle of repose (about 70 percent) and grading to a slope of less than 50 percent. If this is done adequate space must be left at the toe of the dump to allow for the reduction of the slope. The main disadvantages of this technique are the length of the slopes that are produced and the delay in stabilization and revegetation that it involves.

D. RECLAMATION PROCEDURES

1. Stability and Topography

Proper overburden management yields a stability and topography that is suitable for revegetation in accordance with the land-use objectives of the reclamation plan. Mass stability depends basically upon the mechanical properties of the overburden material, the physical structure of dumps and the drainage patterns within the area. Less is known of the effects of weathering and settling upon dump stability, but these processes increase the dump's density water holding capacity, and provide increased stability by increased granular pressure. Water saturation of a fine-grained mass on slopes favors creep or sliding. These and other factors must be borne in mind in a stability analysis of dumped sandstone and shale during the planning and engineering design processes. All dumps should have mass stability before revegetation is begun.

Slopes greater than 50 percent are very difficult to revegetate with present techniques, although slopes of 60-70 percent do occur naturally and can have a stable vegetative cover. The main constraints upon slope reduction are its cost and the greater land area required to accommodate the same amount of material. Further research is required to determine if short (approx. 100 ft.), steep (60-70 percent) slopes can be surface stabilized effectively and at a cost that is less than that of grading to a 50 percent slope. Such procedures are used in Europe but have not been tested in Alberta. In the absence of these methods, one is forced to recommend that all slopes be graded to 50 percent or less if for no other reason than to facilitate revegetation.

Highwalls represent the most abrupt changes in topography left by surface mining without backfilling; they remain as a nearly vertical rock face of limited aesthetic value, and of some hazard to wildlife and people. An effective way of removing the highwall from the landscape is to form a lake in the adjacent pit, but this requires a suitable surrounding topography and water supply. For many pits, however, the cost of providing suitable water and dams may be less than that of backfilling, and there is a possibility of providing a recreational facility. Again, further research is required to determine other ways of handling highwalls, since it is questionable whether any completely exposed highwalls should be left after reclamation is finished.

Surface topography or micro-topography is of particular importance to rapid plant establishment. A rough surface provides more protected micro-sites for seed germination and seedling establishment than does a smooth or packed surface. Because of this, no attempt should be made to smooth or pack spoil material after grading once large boulders and trash are buried. Hard, impermeable surfaces require scarification. Harrowing, packing or washing in the seed are necessary surface treatments on loose, weathered or excessively rocky surfaces. Experiments have demonstrated that the initial distribution of grasses and legumes on overburden is determined largely by the distribution of suitable micro-sites for germination and early growth.

2. Revegetation

Revegetation should be considered a two-step operation. The first step is establishing a ground cover of grasses and legumes to control erosion and act as a nurse crop for secondary vegetation. The second consists of a gradual change of the vegetative cover toward those species that best meet the land-use objectives of the reclamation plan. The first step should be initiated each fall on all areas that have a suitable stability and topography for revegetation and are not part of the active mining operation. Hydroseeding techniques can be used effectively since they are well adapted to the rugged terrain and variable surface topographies common to mined-land.

The second phase of revegetation will take several years for completion and will involve both seeding and planting by techniques suited to the species involved. Some secondary vegetation such as trees and shrubs can be included in the initial seeding step but many will require subsequent plantings. The choice of species and establishment techniques for a given location cannot be generalized and they are best determined by vegetation surveys of nearby undisturbed and disturbed land, operational research trials and well chosen land-use objectives. As with other aspects of reclamation the details of revegetation and landscaping are sufficiently complex to require reclamation specialists to ensure their successful completion.

3. Streams and Small Lakes

Portions of streams within the "active mining center" that were frequented by fish prior to mining and have deteriorated due to mining, must be reclaimed to reform spawning grounds and provide protection and food for fish. Trout stream quality in particular is dependent upon favorable watershed conditions in which land and streambank erosion is controlled. Any stream improvement project associated with reclamation should include a watershed and stream habitat survey and be co-ordinated with provincial fishery management plans. Improvement techniques may involve treating channels, streamsides or watersheds to maintain regulated streamflow, water quality, and aquatic habitats. A suitable mosaic of pools, riffles and stream meanders are necessary for optimum fish production.

The creation of small lakes may be a part of the reclamation plan, or existing lakes may deteriorate due to surface mining and associated water use. Therefore, a lake improvement project may be necessary. Plans for new impoundments or lake level improvements require a careful, individual analysis including a multiple-use survey, impact report, description of the physical features of the site and an evaluation of biological and water quality factors. Existing lakes can be improved by providing spawning grounds, adequate water depth and protection for fish, and by regulating fish and aquatic plant populations. Very small or shallow lakes should not be planned as permanent landscape features outside the alpine and subalpine zones since they are prone to rapid eutrophication, to production of aquatic plants and insects and provide limited opportunities for boating and other recreational uses.

4. Visitor-use and Recreational Facilities

When the land-use objectives of the reclamation plan include recreation or visitor-use, then facilities should be provided for: viewpoints, boating, swimming, fishing, camping, hiking, hunting, skiing or other outdoor activities that are consistent with the amenity values of the area. These projects should be co-ordinated and cost-shared with provincial agencies to ensure a unified regional development of recreational facilities. A good example of where a plan for these facilities should be part of reclamation is in the vicinity of a lake which already has developed parks, summer dwellings and boating facilities and is near to an urban center.

5. Reclamation costs

Each reclamation plan is unique, must be costed separately and may differ widely in cost depending on its objectives. However, costs can be separated by operations as follows:

a) planning and supervision, including surveys, land-use and impact studies;

b) topographic changes such as grading, contouring, backfilling and drainage control;

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c) revegetation;

d) stream and lake improvement;

e) special facilities such as for recreation (cost-shared with the Province).

These costs do not include those monies spent on environmental protection during the exploration or operational phases of the mining.

Each of these five cost factors could range in value from several hundreds to several thousands of dollars per acre, and there is limited information for Alberta upon which to base more accurate estimates. Operational research and pilot reclamation programs may be necessary to project the total reclamation costs over several years for a surface mine of hundreds of acres. The standards set by legislation will also have a bearing upon costs. Since reclamation of mined out areas should proceed during active mining of other areas, reclamation costs can best be viewed as part of the operational costs of the mine as a whole rather than a debt to be paid in the future. In this way the economic feasibility of the whole operation can be assessed as it proceeds. Bonding and "setting aside" funds for reclamation are poor substitutes for actually doing it, even on a small scale.

E. ENVIRONMENTAL IMPACT OF RELATED SURFACE DISTURBANCES

1. Quarries and Gravel Pits

Little attempt has been made in Alberta to reclaim quarries and gravel pits probably because of their small area and scattered location. These smaller land disturbances should be dealt with mainly from an aesthetic point of view. When a gravel pit breaks the continuity of the roadside landscape, it is as aesthetically displeasing as a similar area of junk cars. Care should be taken therefore to backfill, contour and revegetate all quarries, pits, and other small land disturbances that are visible from scenic routes.

2. Rights-of-way and Construction Sites

Final contouring, drainage and revegetation are common practices on most major construction projects such as dams, highways, canals and pipelines. Hydroseeding has probably been used on roadsides more than anywhere else. Highway and pipeline reseeding is usually limited to simple mixtures of grasses and legumes, however, in many places a greater variety of plants would be more desirable and natural. For example, seeding bromegrass and alfalfa in a park detracts from its natural beauty because such plants are not ordinarily found there. Greater attention should be paid to landscaping techniques in these cases.

3. Tar-sand Extraction

The present and proposed tar-sand extraction operations along the Athabasca River will have an environmental impact of a magnitude and complexity as great as coal mining in the foothills if a surface mining technique is adopted throughout the whole tar-sand area. Although coal and overburden yield sediment and some chemicals upon weathering, the bitumen, process chemicals and extraction products of a tar-sand operation are biologically more toxic than coal or overburden. Also the high groundwater levels in this region and the need for the use and wasting of large volumes of water will make the job of environmental protection more difficult. Most of the statements made in this brief apply to tar-sand extraction operations but they do not cover the hydrologic and chemical complexities of the problem. Research should be initiated immediately to assess the full environmental impact of this industrial development.

F. RECOMMENDATIONS FOR PROPOSED SURFACE RECLAMATION LEGISLATION

1. Introduction

Although the focus now is upon disturbances from surface mining of coal, it is assumed here that "surface disturbance" will include any major removal or disruption of land, vegetation or water surfaces.

It is also assumed that reclamation of surface disturbances must take place within the context of land management and land-use zoning. Existing Alberta legislation, through Sec. 15 of The Department of the Environment Act, 1971, already provides for the co-ordinated and regulated development and use of designated areas in the Province.

Another general feature of these recommendations is that the legislative approach to reclamation should be preventative rather than punitive. This in itself stresses the importance of reclamation taking place within the context of planned land-use and "land management zones".

In preparing this legislation it will be important to contact reclamation administrators in other regions of North America who have experience in both the consequences of non-regulated surface mining and the introduction of stringent reclamation regulations. Some argue that regional variations in climate, topography, geology, vegetation or the chemistry of the coal make comparisons of reclamation techniques between regions invalid, but there are fewer regionally unique features when it comes to matters of planning, administration of regulations or inspection of reclamation areas.

There is no attempt here to draft specific clauses that should be a part of surface disturbance legislation in Alberta. This is a task for the experts - the legal draftsmen. However, several provisions that should be considered in the formulation of this new legislation are listed below.

2. Some Recommended Provisions

a. Statement of policies and goals

Alberta statutes are not uniform in their approach to a statutory statement of purposes, policies and goals with respect to environmental matters. The Wilderness Areas Act is an example of a statute with a preamble that sets out environmental policies and goals; the Environment Conservation Act and the Department of the Environment Act do not set down any such policies or goals. Any statute to provide for the reclamation of surface disturbed lands should begin with a clear statement of purpose, policies and goals. If this is done, the public has important criteria by which to judge the effectiveness of the statute, and has a basis for review of specific administrative decisions made under provisions of the Act.

It is important that statutes such as the Right of Entry Arbitration Act, do not have over-riding authority over the proposed surface reclamation legislation in matters of environmental management.

b. Definition of reclamation

The proposed legislation should avoid a restrictive definition of "reclamation". The full range of potentially deleterious effects should be considered, such as damage to vegetation, wildlife habitats, land surfaces, soil, water bodies, aquatic habitats, hazards to public health and property, or reduction of aesthetic and historical values. Reclamation should be viewed broadly to include the amelioration or prevention of any of these deleterious effects. In the case of disturbances from mining, statutory definitions should make it clear that the legislation covers all mining activities including camp clean-up, drilling sites, roads, exploration trenches and waste dumps from underground mining.

c. Unquantified amenities

In the introductory economic discussion of this brief it was pointed out that long-term environmental consequences and costs external to the actual mining operation provide part of the rationale for public regulations. Consideration must be given to a statutory provision that requires all agencies concerned with reclamation planning to identify and develop procedures that "ensure that presently unquantified environmental amenities and values are given appropriate consideration in decision-making along with economic and technical considerations"[1].

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[1] The precedent for statutory entrenchment of such an administrative procedure is to be found in Sec. 102 of the U.S. National Environmental Policy Act.

d. Dual level of regulation

Two levels of regulations are recommended; those that are applicable to all forms and all geographic locations of surface disturbances, and those that are applicable only to particular sites within designated "land management zones". With this basic statutory provision, regulations would then differentiate between those conditions that are common to the whole Province and those that vary geographically. The latter geographic variations should be recognized by the imposition of designated "land management zones" such as the plains, foothills, subalpine, alpine or boreal ecological areas. Further flexibility could be build into the regulatory system by giving enforcement officers authority to impose upon permits special terms and conditions that take into consideration special environmental conditions on a specific mine site. One model for this approach is the 1971 Northern Land Use Regulations established under the 1970 Amendments to the Territorial Lands Act.[2]

e. Pre-planning for reclamation

A major weakness of some existing reclamation legislation is the lack of a statutory requirement for pre-planning and continual reclamation. There is a tendency for reclamation to be considered only towards the end of a mining operation. Particular attention must be given to regulations that would minimize environmental damage both during and immediately after the mining operation. Such regulations should seek to ensure prompt stabilization of soil, establishment of cover crops, and reestablishment of fish and wildlife populations. This implies that inspection must not be limited to a final step in the operation but must be a regular activity through the entire surface-mining process.

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[2] R.S.C., Ch. 48 (1st Suppl.) 1970.

f. Burden of proof on resource user

Legislation should ensure that the burden of proof in respect to establishing environmental protection rests upon the party creating the surface disturbance and not upon the enforcement agency.

The concept of "innocent until proven guilty" has developed in common law with respect to persons. It is only by extension that we have applied this same concept, perhaps innocently, to things, processes, chemicals and excremental industries. That this extension has resulted in poor management of common resources is readily evident. There should be a reversal of this traditional approach.

British Columbia's new reclamation legislation and procedures go part way toward this recommendation by requiring the mining company to submit a report stating its reclamation intentions. The first report from the company should include proposals for operational studies to be carried out during the first year of the permit. An annual reporting, with annually revised research plans, continues until there is sufficient information to formulate a reclamation plan. When the reclamation plan is submitted and approved a permit is granted[1]. In British Columbia, responsibility for action lies with the resource user during the early phases when a reclamation plan is being formulated, but it remains unclear where responsibility would lie for settlement of later disagreements over the nature and extent of environmental damage. Alberta legislation should be planned to place the burden of proof on the resource user even more fully and clearly than the current British Columbia legislation appears to do.

g. Optional contractual agreements

Where the number of surface mining operations is small, it is possible for the administering agency to deal with each operator on an individual basis. This arrangement can develop to the point that the mining industry recognizes that in effect the producer enters into an agreement with the administering agency to protect the environment before the project begins. This arrangement is often handled by a permit system but there would be advantages if legislation provided at least an option to allow the agreement to become contractual[2]. There are legal advantages of a contract in terms of responsibility, liability and enforcement. A further advantage of a "contract to reclaim" is that it could provide a flexible alternative for those situations where, under a permit system, compliance with mandatory reclamation regulations may be impractical or impossible. This approach would require both parties in the contract negotiations - the operator and the administering agency - to possess a considerable degree of reclamation expertise. The contractual approach, if adopted, should not be made mandatory until proven reclamation methods are developed. In the interim, it is recommended that there be a review of statutory mechanisms that would allow reclamation to be undertaken by either the permit system or the contractual agreement.

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[1] This summary of British Columbia's 1970-71 procedure is based on an unpublished report by J.L.E. Hogg, 1971, "The importance of institutional and environmental factors in the formulation of a policy for the reclamation of mined lands in British Columbia". Paper presented at 15th IUFRO Congress, Gainesville, Florida.

[2] For a discussion of the contractual alternative see "Mined-land reclamation in the Western States - a brief look", Hard Minerals Committee, Natural Resources Section, American Bar Association, Nat., Res. Lawyer IV: 552, 1971.

h. Boundary of operations

A legally definable boundary should be drawn around the "active centre of mining" at any given time. This boundary would be used to mark out control points for enforcement of environmental quality standards. All downstream or downwind effects would be contained within this boundary. If environmental quality control is required inside of the boundary it should be administered by the agency that has major regulatory powers for other integral parts of the mining operation, such as mine safety. This procedure would allow the co-existance of mining operations and stringent environmental quality standards because the standards would be applied only up to the boundaries of a zone that would surround the centre of concentrated surface disturbance. If this approach were adopted there would need to be provision for some form of dual jurisdiction to allow separate administration of regulations within and outside a legally definable "centre of operations". Such a provision should be designed so that it does not interfere with the needs outlined in item (e) above, where it was stressed that reclamation steps must be an integral part of the entire mining process. A precedent for this form of administrative procedure is found in the methods proposed for administration of the 1971 Northern Land Use Regulations. There, resource management officers have jurisdiction over all land-use activities associated with petroleum exploration up until a well is established; then an engineer, under a different statutory authority, assumes responsibility for environmental protection on the drilling site during the term of the drilling; enforcement of final clean-up of the site is shared by the two officers. In the context of Alberta reclamation, administrative analogies could be the Energy Resources Conservation Board which might have jurisdiction comparable to the engineer on the northern well site and a newly structured "Division of Reclamation" within the Department of the Environment which could have jurisdiction comparable to that held by the northern resource management officer.

i. Public hearings

Existing surface reclamation legislation in Alberta, where it does refer to enquiries, indicates that an enquiry is discretionary rather than mandatory. This feature of the legislation could be strengthened by requiring public hearings to precede major resource-use allocations within designated "land management zones". The purposed statute should define the circumstances for which a public hearing would be mandatory. Such a provision could also require statutory guarantees of availability to the public of any detailed environmental impact statements prepared by consultants or agencies of Government[1].

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[1] For an example of such a statutory provision see Sec. 102(c) of the U.S. National Environmental Policy Act.

G. SUMMARY

A. Basic Economic Analysis of the Coal Mining Industry in Alberta.

1. From the viewpoint of the mining industry, surface techniques offer real advantages: a) they make possible the recovery of deposits which, for physical reasons cannot be mined by underground methods; b) they provide safer working conditions; c) they usually result in more complete recovery of the deposits; and d) most significantly, they are cheaper in terms of unit costs.
2. Albertan benefits are for the most part measured by direct and indirect employment opportunities, revenues generated for provincial and local governments, and the kilowatts of low cost electricity which provide a source of energy for homes and businesses.
3. Although employment opportunities are created by the presence of the coal mining industry and its related activities, it is not a labour intensive industry.
4. Allocation of areas for industrial activity in combination with other land-uses can be effectively determined by sound and unbiased planning which considers equally all resources, whether quantifiable in economic terms or not.

B. Co-ordination of Surface Coal Mining, Environmental Protection and Reclamation.

1. Before there is any development for coal or other minerals in

a particular region it should be determined whether there is some other over-riding land-use for which the area is better suited, and whether that use would preclude or limit surface disturbances.

2. All land is watershed and to some degree aesthetic and most lands support wildlife. Some land contains fish habitat and some has commercial value for timber or agricultural crops.
3. Ground water flow patterns can be disrupted by strip mining. Because pre-mining groundwater flow patterns can not be expected to reoccur after reclamation, these alterations should be considered as irreversible in the foothills and mountain areas.
4. Coal-bearing areas include lands that support aspen and/or grassland vegetation. In western Alberta these are productive and critical ranges for numerous big game and upland game bird species as well as many equally important non-game species. Notable of the "game" species are mule deer, elk, bighorn sheep, ruffed and sharp-tailed grouse and to a lesser extent mountain goats, caribou, moose, white-tailed deer, Franklins and blue grouse, and white-tailed ptarmigan. The streams and lakes of western Alberta abound in a rich and varied aquatic fauna including a diverse and abundant fish population. Numerous fur-bearing species are located within the coal-belt as well as several rare and endangered wildlife species such as the mountain caribou, mountain goat, bighorn sheep, wolf, grizzly and cougar.

5. Wild ungulates are forced to winter on 10 percent or less of the total mountainous area, with many winter ranges supporting wild ungulate densities of 25 to 100 animals per square mile of range. Open grasslands and aspen pastures comprise over 75 percent of this confined winter range.
6. Requirements for industrial participation in impact studies and operational research in Alberta would hasten the development of environmental protection and reclamation methods.

C. Environmental Protection During Surface Exploration and Mining for Coal.

1. Since both physical and chemical water quality will be affected by surface mining, a water quality monitoring and control program is an integral part of environmental protection during surface coal mining.
2. The water quality parameters most commonly altered by coal mining are suspended solids, turbidity, color, iron, manganese, organic carbon, nitrates, phosphates and alkalinity.
3. Small lakes are quite vulnerable to accelerated eutrophication and need protection from sediment and inorganic chemicals that can leach from the surrounding land when it is disturbed, become concentrated in the lake, and cause algal and aquatic plant blooms.
4. The prime way of combatting soil erosion is by keeping the area of disturbed, unvegetated land to a minimum. Drainage control and sediment catch basins must be used until revegetation is completed.

5. The preferred technique for producing mass stability and a suitable topography of surface mined land is to backfill as many pits as possible with overburden from other areas.

D. Reclamation Procedures.

1. Proper overburden management yields a stability and topography that is suitable for revegetation in accordance with the land-use objectives of the reclamation plan.
2. Slopes greater than 50 percent are very difficult to revegetate with present techniques, although slopes of 60-70 percent do occur naturally and can have a stable vegetative cover. Further research is required to determine if short (approx. 100 ft.), steep (60-70 percent) slopes can be surface stabilized effectively and at a cost that is less than that of grading to a 50 percent slope.
3. An effective way of removing the highwall from the landscape is to form a lake in the adjacent pit, but this requires a suitable surrounding topography and water supply.
4. A rough surface provides more protected micro-sites for seed germination and seedling establishment than does a smooth or packed surface.
5. Revegetation should be considered a two-step operation. The first step is establishing a ground cover of grasses and legumes to control erosion and act as a nurse crop for secondary vegetation. The second consists of a gradual change of the vegetative cover toward those species that best meet the land-use objectives of the reclamation plan.

6. The choice of species and establishment techniques for a given location cannot be generalized and they are best determined by vegetation surveys of nearby undisturbed and disturbed land, operational research trials and well chosen land-use objectives.
7. Portions of streams within the "active mining center" that were frequented by fish prior to mining and have deteriorated due to mining, must be reclaimed to reform spawning grounds and provide protection and food for fish.
8. The creation of small lakes may be a part of the reclamation plan, or existing lakes may deteriorate due to surface mining and associated water use. Therefore, a lake improvement project may be necessary.
9. When the land-use objectives of the reclamation plan include recreation or visitor-use, then facilities should be provided for: viewpoints, boating, swimming, fishing, camping, hiking, hunting, skiing or other outdoor activities that are consistent with the amenity values of the area.
10. Each reclamation plan is unique. Operational research and pilot reclamation programs may be necessary to project the total reclamation costs over several years for a surface mine of hundreds of acres.
11. Since reclamation of mined out areas should proceed during active mining of other areas, reclamation costs can best be viewed as part of the operational costs of the mine as a whole rather than a debt to be paid in the future.

E. Environmental Impact of Related Surface Disturbances.

1. Care should be taken to backfill, contour and revegetate all quarries, pits, and other small land disturbances that are visible from scenic routes.
2. Most of the statements made in this brief apply to tar-sand extraction operations but they do not cover the hydrologic and chemical complexities of the problem. Research should be initiated immediately to assess the full environmental impact of this industrial development.

F. Recommendations for Proposed Surface Reclamation Legislation.

1. A general feature of these recommendations is that the legislative approach to reclamation should be preventative rather than punitive.
2. Any statute to provide for the reclamation of surface disturbed lands must begin with a clear statement of purpose, policies and goals.
3. The proposed legislation should avoid a restrictive definition of "reclamation". The full range of potentially deleterious effects should be considered, such as damage to vegetation, wildlife habitats, land surfaces, soil, water bodies, aquatic habitats, hazards to public health and property, or reduction of aesthetic and historical values. Reclamation should be viewed broadly to include the amelioration or prevention of any of these deleterious effects.

4. Consideration must be given to a statutory provision that requires all agencies concerned with reclamation planning to identify and develop procedures that "ensure that presently unquantified environmental amenities and values are given appropriate consideration in decision-making along with economic and technical considerations".
5. Two levels of regulations are recommended: those that are applicable to all forms and all geographic locations of surface disturbances and those that are applicable only to particular sites within designated "land management zones".
6. Particular attention must be given to regulations that would minimize environmental damage both during and immediately after the mining operation.
7. Legislation should ensure that the burden of proof in respect to establishing enviornmental protection rests upon the party creating the surface disturbance and not upon the enforcement agency. A report from the company should include proposals for operational studies to be carried out during the first year of the permit.
8. It is recommended that there be a review of statutory mechanisms that would allow reclamation to be undertaken by either the permit system or the contractual agreement.
9. If a legally definable boundary were adopted, there would need to be provision for some form of dual jurisdiction to allow separate administration of regulations within and outside a legally definable "centre of operations".

10. The purposed statute could define the circumstances for which a public hearing would be mandatory.

It is a [illegible] decision in me, what authors want to [illegible] in this brief....

H. CONTRIBUTORS TO THE BRIEF

1. Authors

The following members of the Canada Department of the Environment have prepared this brief as a work group with major authorship in the areas indicated:

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- environmental protection, land-use, reclamation, and general organization of the brief.

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- legislative and administrative provisions.

Jack H. Smyth, M.Sc, (For.), Economist, Canadian Forestry Service, Northern Forest Research Centre, Edmonton.

- economics of resource use.

Robert H. Swanson, M.Sc, Research Scientist, Canadian Forestry Service, Northern Forest Research Centre, Edmonton.

- water management and land-use co-ordination.

John G. Stelfox, M.Sc, Research Biologist, Canadian Wildlife Service, Edmonton.

- wildlife management.

2. Acknowledgments

The above authors would like to acknowledge the advice and assistance given by various members of the following agencies of the Department of the Environment: Canadian Forestry Service, Edmonton; Canadian Wildlife Service, Edmonton; Water Survey of Canada, Water Planning and Operations, Regina, Inland Waters Branch, Calgary; Environmental Protection Service, Ottawa; and the Fisheries Service, Central Region, Winnipeg.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

In your view, is the present state of knowledge and technology in surface reclamation and watershed control adequate to proceed with the development of regulations and legislation in respect of strip mining?

MR. M.H. DRINKWATER

I think there is sufficient information to proceed with regulations. There are still many gaps of information that do need research and development and demonstration. In our work in the eastern slopes, where the water quality is concerned, we are able to provide prescriptions for land management but it is very obvious when you get into the process of establishing these prescriptions that there are numerous gaps. It is perhaps only in the process of doing the work, finding out where the problems lie and develop from the on-going program the hypothesis for which further research and development can follow.

DR. WALTER TROST

Where further research is needed, do you feel that jointly sponsored or jointly developed programs with industry and the several levels of government would be a suitable way forward?

MR. M.H. DRINKWATER

I think it would and I think there are already projects underway. Avenues have already been opened up. We are very willing to co-operate, we have received excellent co-operation from industry and from provincial government.

MR. PAUL BABEY

On the proposal for a dual level of regulations, were you thinking in terms of separating the various areas, the mountains, the plains, the foothills, or were you thinking of further divisions to deal with specific regions within any one of these areas?

MR. M.H. DRINKWATER

I think certainly there is the question of the mountains, the foothills, and the plains. They offer very definite degrees of problems. The dual regulation considers the general area but then very specifically the area where the boundaries already are established.

4.7

1450 Aquitaine Tower,
540 - 5th Avenue S.W.,
Calgary 1, Alberta,
December 10, 1971.

The Secretary,
Environment Conservation Authority,
1002, 620 - 7th Ave. S.W.,
Calgary 2, Alberta.

Dear Sir:

Enclosed herewith are three copies of a brief submission on behalf of Frank Brown and Robert Clive Brown for the public hearing in Calgary on December 21, 1971, relative to the impact on the environment of resource development in Alberta.

This brief will be given orally by Mr. John Stein of the law firm of McLaws and Company, Calgary, who will be available also to answer any questions concerning the subject.

Since the operation referred to in the brief is in the immediate Edmonton area, we are sending three copies of the brief to your Edmonton office.

Yours truly,

Robert Clive Brown

c.c. to The Secretary,
Environment Conservation Authority,
9912 - 107 Street,
Edmonton, Alberta.

1450 Aquitaine Tower
540 Fifth Avenue S.W.
Calgary 1, Alberta

December 10, 1971

The Secretary
Environment Conservation Authority
1002, 620 - 7th Avenue S.W.
Calgary 2, Alberta

Dear Sir:

Firstly, we would like to state that we are extremely pleased to see the Government making this move relative to the impact on the environment of resource development in Alberta, since we consider that the move is long overdue.

Our submission concerns, firstly, the conflict created where two valuable natural resources exist. One is being recovered and the other destroyed in the process.

Present legislation or regulations allow a utility company to move onto private lands, destroy the surface and the resource without paying any compensation until the operation has been completed, which in the case under consideration, is 7 to 10 years after commencement.

Present regulations allow the utility company to leave several hundred acres in an unsightly condition because they do not have to compensate until the whole operation is completed.

Justification for such operations by the utility under consideration has always been that adequate compensation to the land and other resource owners, and proper surface reclamation would increase the cost of electric power to Alberta consumers. This is a false premise because it can be shown that proper planning in advance, as envisioned by your proposed legislation, particularly in this case, would have resulted in a far more economical operation. The problem in this, as in other instances, is not one of economics but of corporate policy which prefers not to deal with such problems.

Our submission concerns not so much the coal strip mining method in itself, as it does the irreparable pollution or contamination of another valuable resource during the coal strip mining operation. We, of course, are referring to a specific case where a valuable , high quality, sand and gravel deposit overlying the coal in the Wabamun area of Alberta is currently being removed and stockpiled on the surface, mainly in winrows, as part of the coal stripping operation, whereby coal is produced to operate the thermal power generating station of Calgary Power Ltd. at Wabamun, Alberta. In the course of stripping their coal, only a portion of the sand and gravel in place is removed because of the large size of the coal stripping equipment and the considerable variation in the thickness of the sand and gravel seams. The worst feature, however, is not so much the poor recovery as the great amount of contamination of the sand and gravel which takes place during the removal and stockpiling of it in the manner which is being used at the present time by Calgary Power's contractor.

From the most recent observations of the stockpiled material, it would appear that any sand and gravel which has not already been contaminated at the time of placing in the stockpile, will be contaminated and polluted in the stockpile in the years ahead by the blowing coal dust and clay from the coal stripping and hauling operations, before it is marketed.

Anyone who is familiar with sand and gravel producing operations will readily admit that coal and coal dust are the worst of all contaminants in sand and gravel because of the great additional expense required to remove them. In some cases it is impossible to remove these contaminants sufficiently to make the product marketable, as the cost would be prohibitive.

We are concerned here not only with the irreparable contamination and pollution of a valuable but diminishing natural resource of the Province, but also with the unsightly appearance of the landscape as it exists in this area today. This stockpiled or winrowed sand and gravel, which we contend has been rendered unfit for sale by the coal strip mining operations of Calgary Power Ltd., because the product will be unsalable, will remain there for years to come, clay and other dust will blow into the piles along with weed seeds and other material. It will not be too long before the whole area of stockpiled sand and gravel will be covered by a mass of weeds and the roots therefrom which have worked their way deep into the piles of sand and gravel. This area will then truly be an unsightly mess and certainly no credit to the Province in an area which is considered a resort area mainly.

The operator of the coal strip mine, Calgary Power Ltd., has carried out some reclamation of the surface in an area where the coal has been removed. They claim that they are doing a satisfactory surface reclamation job. We, being completely familiar with the whole coal strip mining operation in the Wabamun area, do not agree with their contention. Calgary Power Ltd. has a surface contour map of the whole area with contours at 5-foot intervals which was prepared as a result of an aerial photograph survey prior to the commencement of coal strip mining operations. Therefore, they do know what the original surface configuration was. They are not restoring the surface of the strip mined area to anything like its original configuration. They now have large hills and ravines where none used to exist. Since the owner of the sand and gravel referred to above herein, eventually ends up owning the surface, it is important that the strip mined land be restored to its original configuration as nearly as possible, whereas the method being used by Calgary Power Ltd. at present to reclaim the surface, is the one involving the least possible expense as far as they are concerned.

One of the most serious aspects of this whole coal strip mining operation in the Wabamun area is that the operator, Calgary Power Ltd., has not paid one dollar in compensation to the owners of the surface and the sand and gravel as of this date.

We are particularly impressed by your brochure entitled, "Principles Underlying Proposed Surface Reclamation Legislation". We believe that this position paper very clearly sets out the many situations which should be used as a basis for the preparation of new surface reclamation legislation. We are particularly impressed with Clauses 2.1, 2.2, 2.3, 2.4, 2.5, and 4.11 since we feel that these Clauses expose the source of most of our troubles today. In the case of the aforementioned sand and gravel deposit which overlies the stripable coal deposit in the Wabamun area of Alberta, the existance of the sand and gravel deposit, its thickness, extent and quality were all known to the operator, Calgary Power Ltd., in advance of and before commencing any coal strip mining operations, since several hundred test holes were drilled through both the overburden, sand and gravel, and the coal, by the operator prior to the commencement of any coal stripping or coal mining operations. This is clearly a case of where it was known in advance that the sand and gravel deposit would have to be contended with. It is estimated that there is 62, 177,000 cubic yards of recoverable sand and gravel in this deposit of which a substantial proportion overlies the coal deposit which is being strip-mined. In this case the proposed legislation which envisages comprehensive environmental planning before the fact, would have prevented the irrepairable damage which has been done to this valuable natural resource.

It would be very difficult for anyone reading this submission to visualize the unbelievable mess that has been created by the strip-mining operator, Calgary Power Ltd., and also the utter disregard they have shown for the landscape, the useable stands of trees, and the valuable sand and gravel, all of which have been destroyed or rendered unsaleable.

We have excellent colored photographs showing the situation referred to herein, and would be pleased to make a set of these available to you; however, we would strongly urge that one or more of your representatives visit the site of the coal strip-mining operations and see for yourselves the destruction and waste that is taking place.

Yours truly,

R.C. Brown

Robert Clive Brown

Frank Brown

Frank Brown

RCB:dlo

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

You are obviously touching on a matter of considerable importance; the conflict of uses and resource development. Who owns the surface rights in this case?

MR. JOHN STEIN

In this case there is a combination. The Browns own one third of the 3000 acres. They own the surface and gravel rights under the existing law. In the other cases they have leased the gravel rights from other surface owners.

DR. WALTER TROST

Is there a present market for the sand and gravel?

MR. JOHN STEIN

Yes. There was evidence given before the Right of Entry Arbitration Board of the marketing conditions based on engineering studies that were done.

DR. WALTER TROST

Is the sand and gravel that is being stockpiled for Brown and Brown imperilled while it is in stockpile?

MR. JOHN STEIN

Yes. The two points that they make are: (1) Because of the large-scale operations that are being carried out in order to strip the over-burden and then recover the coal, they cannot recover the percentage of gravel and sand which they would otherwise recover by the methods of a sand and gravel operator. (2) It is piled where coal dust is flung from the bucket as it loads the trucks. Trucks drive through the piles of stockpiled gravel and the coal dust gets into these piles. Professional witnesses gave testimony before the Right of Entry Arbitration Board that the gravel was entirely destroyed for concrete purposes although usable for fill and highway work.

DR. WALTER TROST

If the sand and gravel were to be back-filled into a mining pit and then the surface reclaimed on top of it, would that be agreeable to your clients, or is it impractical?

MR. JOHN STEIN

I think the cost would be impractical. If reclaiming the soil makes it impossible to recover the sand and gravel the onus of the legislation should be upon the person who recovers the coal to provide adequate compensation for the sand and gravel owner. There are approximately 62 million cubic yards of sand and gravel which is a very valuable resource.

DR. WALTER TROST

In this particular case of conflict between different uses, are you and your clients of the view that there is a practical way of getting out the coal and preserving the values of the sand and gravel?

MR. JOHN STEIN

No, not in a large scale operation like that of Calgary Power. If the operator is the sand and gravel operator who, as well as stripping off the the sand and gravel, would load it and take it away to a separate stockpile. It could be saved that way.

DR. WALTER TROST

Have your client and Calgary Power had consultations and discussions about resolving these problems?

MR. JOHN STEIN

For ten years.

DR. WALTER TROST

Are they amicable or is it before the courts?

MR. JOHN STEIN

No. But the position of our clients is that Calgary Power should take over all rights and then recover the sand and gravel with the same equipment. That is the most economic way of doing it.

DR. WALTER TROST

Are the recommendations that you made in your submission adequate to deal with the problem?

MR. JOHN STEIN

Yes.

A BRIEF ON THE ENVIRONMENTAL IMPACT OF SURFACE MINING IN ALBERTA

THE CALGARY FIELD NATURALISTS' SOCIETY

Presented by Ian Halliday

The Environment Conservation Authority states in the third paragraph of its prospectus on surface mining "No one will deny the economic benefits that can result from increased industrial activities of this kind and it is doubtful whether anyone would seriously recommend that all strip mining activities cease."

The Calgary Field Naturalists' Society seriously questions the inference that there are in fact any long term economic benefits to be derived from strip mining. If no regard is paid to any costs except for those incurred in the physical extraction of coal then it may appear that strip mining can be a profitable venture. When the costs of the permanent destruction of other values both economic and aesthetic are added then strip mining will probably be seen to be a non-profitable operation for the people of Alberta.

Costs which must be added to the bare mining expenses, among others are:

1. Destruction of topsoil and subsoil.
2. Destruction of growing plants.
3. Pollution of rivers and lakes.
4. Destruction of wildlife and wildlife habitat.
5. Destruction of sport and recreation areas.
6. Destruction of historic and archaeological sites.
7. Destruction of rare, endangered or unique plants or animals.

We believe that all of these things must be taken into account and assessed a value to be balanced against the short term gain to be obtained from mining a wasting asset and that the balance must weigh heavily in favour of strip mining before it is permitted. No mineral, however valuable, can possibly equal the productivity of soil which,if maintained, can produce crops of value forever.

The Calgary Field Naturalists' Society is very much concerned with the ecological changes which could result from additional surface mining from the Crowsnest to Smoky River areas which includes Canmore and areas principally along the Kananaskis, Sheep, Highwood and Oldman Rivers. All of these regions are situated in the Rocky Mountain Front range and its adjacent foothills belt. Exploration trenches have been dug recently in many localities immediately above timberline in the Rocky Mountain Front area in search of low and medium volatile coking coal reserves. It is needless to point out that these particular regions are extremely sensitive to any environmental changes because of the much slower growth of the native flora and fauna at this higher elevation. Our Society is not in favour of exploiting coal in areas of this nature nor where there is great natural and aesthetic significance such as the approaches to Banff National Park. These mountain habitats constitute a small part of the province when compared to the relatively large areas of prairie and boreal forest and because of their rarity are of special value and should be protected accordingly.

It is essential that regulations be made requiring comprehensive surveys of at least two distinct types before strip mining can be permitted. These are:

1. Archaeological and ecological surveys to determine if there are unique or endangered species of plants or animals or cultural values.

2. Economic surveys to determine if the area proposed for mining will destroy lands or areas which have a potential for growing forests or crops or that have scenic, tourist, sport or recreation values.

It is also essential that research be conducted into three aspects of land reclamation which have to our knowledge not been studied in Alberta and for which definite answers are required. These three areas of research are:

1. Reconstructing soil profiles, i.e. re-building of the subsoil layers and soil horizons to reconstitute the original soil profile. Soil profiles are complex biogeochemical systems which develop over several thousands of years; their re-creation is not a simple thing and their destruction should not be taken lightly.

2. The use of native species for rapid re-vegetation of bare soil surfaces. The use of introduced non-native plant species such as red fescue grass, blue grass, and clovers, are not ecologically acceptable as they involve introducing foreign species into native vegetation.

3. Re-creating original native plant communities. A plant community is composed of numerous species, each one in a specific proportion of abundance and having its unique sociological role with the other species and its specific ecological role within the total ecosystem.

We submit that these highly complex problems must be solved by the strip-mining operators, and before the strip-mining is carried out. If necessary, if a solution is not presently available, research will have to be carried out to solve these problems in an ecologically acceptable manner.

If strip mining is to be permitted then new laws or regulations are required to govern the manner in which mining may be conducted and land reclamation procedures to be followed. On publicly owned lands such regulation should be an easy matter but on privately owned lands it may be necessary to have either a new land reform law or amendments to the existing Land Act, Municipal Act, the Land Titles Act and possibly others. A large percentage of the mineral rights in the southern half of the Province of Alberta is no longer in the public domain. These rights are owned by Railway Companies, The Hudson's Bay Company, Mining companies, Oil companies and by many farmers and ranchers. In many cases the surface rights are owned by the same persons. Inevitably when a strip mining operation is contemplated the miner purchases the title to the surface. Historically he has then had a fee simple title to the land which has allowed him to do as he pleased with it. The fee simple title like the domesticated goat has been of disservice to mankind for long enough and the time has long since passed when Albertans can allow a landowner to destroy or abuse his land. We are not owners of our land forever. At best we have a lease during our lifetime after which it must be given to our sons and daughters or sold to another person. Our title is a fleeting thing and there should go with the rights of ownership a duty and responsibility to leave the land on our death, in no worse condition than we found it.

It has been reported to us that the Alberta Coal Company has not re-claimed or restored to productivity any of the lands which have been stripped to supply coal to the large steam generating plant at Lake Wabamun. We have been told that the mining company has been permitted to strip and sell the loam from the area to be mined. Such practices must cease!

Land reclamation must be carried out by all strip-mining operators. This must be done as soon as possible after the coal has been removed from a site. Land reclamation measures must include:

1. Replacement of the original subsoil and topsoil in their proper sequence and as nearly as possible to the original land forms and contours. There should be no such thing as spoil banks.

2. In forested land all timber should be salvaged and used. Proper disposal must be made of "slash." The organic debris should be uniformly spread on the site and compacted to encourage its decomposition and incorporation into the organic litter of the soil.

3. Re-vegetation - The land must be restored to its original native vegetation, and it is critical that re-vegetation of the site be done immediately to prevent water and wind erosion of the bare soil surface. Operators should be required to maintain tree nurseries or have access to an adequate source of tree seedlings.

We are aware of the difficult problems involved with these reclamation requirements, nevertheless these requirements are essential in order to avoid serious damage and deterioration of our native ecosystems.

The costs of conducting surveys, research and reclamation procedures should, insofar as possible, be borne by the mine operators and should not be another burden on the public Treasury.

We have in this province many things which are unique and to which the people of Alberta have attached great value. The recent controversy over strip mining on Mount Rundle illustrates the value which has been placed on a well-known mountain in one of our National Parks. Other things are of equal value when their location is known. As an example of a rare species and the need for providing for protection of certain areas we would suggest that strip mining should never be permitted in the north west quarter of Township 21, Range 9, West of the Fifth Meridian. There is a little yellow alpine flower which grows here. It belongs to the mustard family and was discovered in 1969 by Dr. G. A. Mulligan. It has been named Draba kananaskis and while few persons know of its existence the fact that in all the world this is the only place where it has been found should be sufficient reason for assuring that it is not exterminated with one stroke of a dragline.

December 20, 1971

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

Assume that the topsoil has been restored but the rest of the soil profile is just a random return, have you any evidence or any knowledge as to what effects that might have on growth?

MR. IAN HALLIDAY

A portion of this brief was prepared by botanists. I am a geologist but I think I can say that most of the discussion on returning the soils to its original position has involved just the expression "the soil", and the series of soil is a very complicated system. In some parts of the province we have the grey layer, we have the brown layer and so on. On top of this we have the so-called top soil layer. When this layer is stripped off, it's usually bunched together so that you may get three or four layers together. When it is put back it is just put back as a uniform mixture and this means that the soil profile is not restored to the native position which it held originally. The original grasses, plants, may not grow in the same nammer which they did on the original soil surface. I think this is a matter that should be considered carefully. It is not a simple matter of taking off the top foot or two feet or three feet, piling it in a big mound and then spreading back on the land again and calling it reclamation. It is a much more complicated system than this and I think this is an area in which we will make the point that there has not been sufficient research and this is one of the things we wish to point out today.

4.9

NATIONAL AND PROVINCIAL PARKS ASSOCIATION

CALGARY-BANFF CHAPTER

PRESENTED BY MR. CHRIS DUNKLEY

This public hearing is an exercise in participatory democracy and the National and Provincial Parks Association members, as concerned citizens appreciate the opportunity of presenting this brief. We are basically concerned with the preservation of the scenic and aesthetic values of which we Albertans are abundantly endowed, particularly in the foothill belt of our province. For this reason we must defend our land against unnecessary destruction of the long term renewable resources. First, we wish to commend the Alberta government on the creation of the Environmental Conservation Authority as this body should serve a very constructive purpose in environmental preservation.

1. ALBERTA POSITION PAPER

We have studied the November, 1971 "draft position statement" issued by the Department of the Environment designed to acquaint Albertans with the underlying philosophy behind the proposed legislation on surface reclamation. We heartily concur with the principles of this paper.

Comprehensive environmental planning before permits are issued to developers or mine operators is logical. Holding the resource user responsible for full reparation costs and your item 2.6 giving a voice to our legislature and the public through public hearings on certain types of development is a democratic way for us to weigh the social costs of such developments.

ITEM 4.01, ACQUISITION OF RIGHTS

We heartily endorse the principle that the province be authorized to acquire existing rights to resources under reasonable terms of acquisition, including the rights granted prior to the transfer of Resources Agreement in 1930.

ITEM 4.06, APPLICATION AND APPROVAL

The purpose of the proposed legislation is to protect our environment so it is imperative that environmental factors have priority; prior to the sale or removal of resource rights, prior to issuance of exploration or development permits.

ITEM 4.08, REGULATIONS

Regulations should be broad enough in scope to cover all types of surface damage, including such operations as sand and gravel quarries, land fills, petroleum and power development, lumber and pulp operations.

2. MONTANA LEGISLATION

We have in our possession a copy of House Bill 243, Chapter 252, Laws of 1971, enacted by the Legislative Assembly of the State of Montana, U.S.A. An act requiring the licensing of persons engaged in mining explorations and relative activities; requiring permits for the conduct of development, mining and related activities; providing for reclamation of exposed, developed and mixed land; providing for the administration and enforcement of the Act.

We also have a copy of the Montana Open Cut or Strip Mine Reclamation Act, Chapter 224, Session Laws of 1971. Although we do not understand why two acts were needed, these two pieces of legislation do follow in general the philosophy of our own position paper; however, by reference to some of the provisions of this piece of legislation we will be able to emphasize some of the imperfections or points that we should guard against in designing our legislation.

Section 9(g) of the Montana House Bill 243, Chapter 252 reads, "to the extent that is practical." Section 9(a) reads "to the extent feasible." This type of wording provides escape provisions when enforcement is necessary and should not appear in our proposed Act. Section 10(b) provides that reparation plans may be modified when a plan is "impossible or impractical." This too is an escape type provision. We mention these two only to emphasize the need for careful designing of our legislation so that proper enforcement is possible.

Section 11 of the Montana Act limits the amount of a reparation bond to $500 per acre. This is ridiculously inadequate. We will deal with this point later, but engineering consultants have estimated reparation costs to be as high as $1200, $2000 or even up to $5000 per acre depending on the terrain. A reparation bond should cover actual eventual costs and when we mention reparation costs, we mean full reparation so that the recreational and aesthetic values of that land will not be lost forever.

Section 14 defines that a permit may be denied for specified reasons but no provision is made to deny a permit purely for ecological, aesthetic or recreational reasons.

Section 16 sets up an Appeal Board with a majority of members; two from the engineering professions, one from the Department of Planning and Economic Development, and one from the legal staff of the Attorney General; a total of four who are not likely to be trained in ecology, balanced with three men, one from the Department of Health, one from the Department of Agriculture and one from the Fish and Game Association. The whole purpose of this Act is to protect the environment so there is no question that the Board should have a balance of men trained and inclined to preserve health and environmental qualities. Most certainly, trained ecologists should be represented on such a board.

Section 20 and Section 22 put maximum limits of $100 and $1000 for fines for offences under this Act. The ecological damage done by developers can be disastrous and in our opinion offences under such legislation should not have ridiculously low maximum limits.

Section 9 of Chapter 224, Montana Open Cut or Strip Mine Reclamation Act places an upper limit of $1000 per acre for a reparation bond. A reparation bond must be at least equal to the estimated cost of anticipated reparation.

Many U.S. studies have demonstrated costs ranging from $1200 to $5000 per acre for disturbed land (see Engineering Study by Meridan Engineering Incorporated, Philadelphia). This could represent the social costs to Albertans. This cost could be borne in the year of reparation or amortized with an interest factor over, say, twenty years. In any event all recent conferences on pollution and environmental destruction are finding ~~that the conclusion~~ that the polluter or the developer must face this cost. Our legislation must irrevocably place the cost where it lies. Developers must be prepared to bond themselves for the full cost of reparation.

3. CONTRACT PROVISIONS FOR MONTANA RECLAMATION ACT

Section 1 of this contract allows an operator to proceed with his mining project without approval, sixty days after the Commission has received his reparation plan. We would not favour this provision to operate without a written approval from government as someone in government must make a commitment by either approving or disapproving a project. Government must not have provisions to escape responsibility either and it is obvious that the responsible government body must commit itself within certain time limits.

Nowhere in the Montana contract is there any obligation to meet the rules and regulations pursuant to the Montana Open Cut and Strip Mining Reclamation Act. Obviously any contract should be governed by the regulations pertaining to the Act and be considered as part of the contract.

Section 2(k) of the contract states that "no more than two seeding attempts will be required of the operator if he meets the requirements of the mining plan as it relates to seeding and planning." This is an obvious escape provision. Developers must be held responsible for adequate reparation.

4. STRIP MINING

Recent trends of uncontrolled technology have resulted in tremendous industrial growth which has presented us with an ecological nightmare of unimaginable proportions. We shall mention only one aspect of this problem. Mining practices in the United States have laid waste to immense areas of land and in many cases have ruined it beyond even modern technology's ability to restore. Accepting enormous projected demand for coal, it is reasonable to assume that coal mining in general and strip mining in particular will increase rapidly in the areas where large coal deposits are and Alberta is abundantly endowed with a major part of the world's known reserves of coal.

Environmentally this demand should forewarn us of a possible upheaval in earth-scarring danger unequalled since the Ice Age. Coal is not scarce so scarcity cannot be used as an excuse for tollerating an ecologically and socially unacceptable method of extraction.

The State of Montana has the largest strip mine reserves in the United States and they have seen fit to pass in 1971, very severe legislation in their Open Cut and Strip Mine Reclamation Act. The State of Kentucky and many European countries now have very severe legislation. Anyone who investigates the extreme ecological damage in the United States will realize the necessity for us to profit by the irreparable mistakes that have occurred across the border.

5. FINANCIAL RESPONSIBILITY AND THE ECONOMIC ASPECTS OF SURFACE MINING

Since there is a great danger that a developer or strip mining company could do considerable damage to affected land and then have insufficient assets even in bankruptcy to cover the cost of the reparation, we think it is essential that reparation deposit~~i~~s or bonding requirements be very tightly enforceable. To assure financial responsibility for reparation costs, we recommend that our legislation provide for what could be called a "contract fee" or "reparation fee." When the Department of the Environment issues a permit or enters into a contract with a developer or mine operator, a fee should be levied in an amount that is sufficient to meet the full cost of eventual reparation.

Government regulations require life insurance companies, banks and trust companies to deposit a very large reserve with the government to ensure adequate protection to the public. While this would be new to the mining industry, we see nothing wrong with setting a high acreage fee in order to protect the public for anticipated reparation costs. Then a credit for the full cost of reparation could be allowed as the company performs its reparation obligation. This would accomplish the following:

1. It would definitely pinpoint reparation as an immediate operating cost. If a developer could not meet this cost he would not proceed with the project.

2. It would encourage a developer to make early reparation in order to receive the tax credit.

3. It would clarify actual reparation costs. If tax credit claims based on reparation costs go up, then the province could immediately elevate the contract fee ~~mineral tax rate~~ based on acreage.

4. It would eliminate the necessity for bonding requirements entirely.

For the above reasons, we would recommend that this idea be a provision of our new legislation.

6. COST BENEFIT ANALYSIS

The economic cost of strip mining would necessitate a dollar value being placed on such factors as siltation, soil erosion and in some areas, acid drainage, loss of recreational use, tourist trade loss, etc. All of us will bear this cost but only a relative few would profit from the mining operation. What makes the proposition worse is that the benefit to the few is for a very short period of years, but the social cost is borne for generations.

Economic policy cannot be measured on the grounds that some may gain. Many public policies have adverse effects on a few but the majority may benefit. For example, a government may refuse to impose quotas on Japanese imports. Workers here in a competitive industry may suffer, but all of us would benefit from lower prices. So banning strip mining in areas where permanent damage is likely to be done may impose hardships on a few,but generations of Canadians will benefit.

A genuine cost benefit analysis must be made before any mining project begins. The total value of resources of all kinds must be evaluated.

Mineral development must not automatically take precedence over other resource possibilities. Instead we must weigh the short term benefits of mineral extraction against the long term potential of the other resources.

A Board of Review, under the Environmental Conservation Authority should have authority to assess this balance of priority between the extractive industry and the future long range potential for the other resources.

It would be our thinking that such a Board of Review should be staffed with competent professionals such as fishery and wildlife biologists, to assess the recreational potential of fish and game resources, an agricultural scientist, a forester, a landscape architect, a mining engineer, recreation specialist, soils engineer, civil engineer, an ecologist, tourism specialist, etc, each to assess the future potential from his particular field of training.

It is only by such an assessment that the "social cost" and the "social benefit" can be weighed.

7. JOB POTENTIAL OF STRIP MINING

Surface mining spokesmen could estimate that "X" jobs would be created from direct employment in a mining operation. To this number, one could add those jobs indirectly created via the supplying industries or others affiliated in some way. This would indicate the number of people who could claim employment benefit from surface mining.

Highly detailed statistical tables have been constructed for the State of West Virginia by the Regional Research Institute of W.V.U. (see Strip Mining in America, Sierra Club, p. 43). From these tables employment multiplier factors have been calculated for each industry in West Virginia. In the case of strip mining the multiplier factor is only 2.7. This means that if one person is directly employed in a strip mining operation, 2.7 additional people are indirectly added to the total employment potential of the industry. Any careful research of the strip mining industry will demonstrate it has a very limited job creation potential.

One important consideration is the fact that this multiplier factor assumes that all other factors in the economy remain static. Without strip mining in a given area, the tourist potential, the guide and outfitter potential, the whole recreational industry could expand to provide far greater job potential and this potential would continue to add to our economy over a much longer period of time.

8. WATERSHEDS AND SILTATION

The watersheds of our eastern Rockies are vitally important. A book could be written on this subject alone and we are sure the E.C.A. is well aware of their importance.

We will bring to your attention only one study. In eastern Kentucky much coal mining activity has resulted in a joint federal and State of Kentucky study. This 1955-1959 study compared two adjacent watersheds. The valley that remained in timber yielded 27.9 tons of silt per square mile annually and the other which had been heavily strip mined flooded leaving basins with 30,000 tons of acid reddened mud per square mile.

It must be recognized that much of our water required by industry and agriculture is stored in the soil of forested foothills belts and slowly released into streams. This water is a resource of great value to Alberta and its quality, quantity and time of delivery would be very adversely affected by uncontrolled strip mining in this area.

9. SCENIC, RECREATION AND AESTHETIC VALUES

It is well known that coal bearing formations run almost the full length of the foothills belt in Alberta. Most of this land has previously been managed as watershed, for timber production or grazing. We believe that especially in this region, but also in other regions, careful consideration must be given to scenic, recreational and aesthetic values of land before strip mining is allowed. Our population while fairly small is now largely urbanized and this trend is increasing. Urban populations are highly mobile and in the future will have more and more leisure hours. Hence the recreational values of the foothills will increase rapidly. Tourism is already the largest single industry in Alberta and as long as our foothills remain unspoiled, we see no reason to doubt that the future potential of the scenic, aesthetic and recreational value of this area is enormous.

10. CANMORE RECREATIONAL POTENTIAL

We would like to cite our specific case, not because it is unique or more important than others but because we of the NPPAC have a particular insight into it. Current National Parks policy calls for major tourist ~~transit~~ development to take place outside of the parks themselves. However, currently there is a proposal to develop a $23 million resort and service centre at Lake Louise within Banff National Park. Thousands of concerned individuals and groups will oppose this because they believe that nature should come first in the National Parks. But we also are interested in people and recreation. Much of the lodging, service, and the indoor recreational part of this development could take place in Canmore but not unless it can be demonstrated that Canmore is suitable. We therefore urge that strip mining in this area may be economically unsound even if reclamation is eventually effective. Heavy equipment, dust and even temporary open scars on the land won't attract tourists. While we trust the reclamation intent of Canmore Mines Ltd., we also know that they are stripping at the base of the Rundle Mountains, a mountain area which because of climate and terrain will be hard to restore. One of their current proposals for reclamation is to take peat from nearby bogs to serve as new top soil. Peat bogs are themselves the biologically most productive areas in this region. They should not be disturbed, let alone stripped to provide covering to make reclamation look falsely feasible and impressive.

We request that permission to strip more land in the Canmore region and Bow Valley corridor be denied because of the tremendous recreation, tourist, scenic, and aesthetic value of this area.

We realize that an extensive study of the recreational potential of the Bow River corridor has been made and that public hearings may be held, but future recreational demand adjacent to the large urban population of Calgary will require a tremendously increased emphasis on recreational development on our foothills area. It is vitally important that this potential should not be marred by faulty priority of land use.

11. GENERAL COMMENTS

Any serious commitment by the Province of Alberta to environmental quality and hence the quality of life must place the blame for damage at the source. People, municipalities and industry must be made to assume the cost of realistic corrective measures when resources owned by all Albertans are used or degraded.

We sincerely believe that no one generation owns the productive capacity of our land. We are the custodians of a great natural environment and future generations have a right to inherit a land that will produce their food requirements, a water and air supply clear and clean, but of equal importance, they are entitled to inherit a land of beauty where there are tranquil places to escape the pressures of urban society. Our custodianship needs to become more responsible.

It is important for us to realize that there is a vast difference between the damage done by a forest fire and the destruction done by strip mining technology using such machines as the big muskee with its 310 foot boom, 220 cubic yard bucket, capable to moving four million cubic yards per month.

In the former, the soil base produced by thousands of years of time is still there and the potential for reforestation is preserved. However, after irresponsible strip mining, productivity is irreparably destroyed and the natural beauty is irretrievably lost for centuries.

The E.C.A. is aware of the extensive exploration work that has documented the tremendous reserves of coal adjacent to the Coalman and Kananaskis forestry road and is also aware of the complete stripping of forest vegetation at the site of the Kaiser strip mining operation, where a very large area will be absolutely destroyed from a productive, aesthetic and scenic point of view for many hundreds of years. A possibility that this type of destruction could take place all through our heavily forested foothills should trigger immediate and lasting protection by the type of legislation the position paper envisions.

Conservation of the quality of our air, our water, our quietude, our productive and scenic assets becomes a positive force only in so far as it advocates as a set of values which are of maximum value to society. When the rights of the land, and society as a unit are ignored, and Gross National Product becomes the measure of good, repercussions are inevitable.

It is appropriate to quote from a recent speech by the Prime Minister of Canada as reported in the Globe and Mail on May 5, 1971. "Why then do western governments continue to worship at the temple of Gross National Product? Isn't it time we paid heed to resource exhaustion, to environmental deterioration, to the social costs of overcrowding, to the extent of solid waste disposal? Shouldn't we, in short, be replacing our reliance on G.N.P. with a much more revealing figure, a new statistic which we might call Net Social Benefit."

We hope we have finally reached the stage where human beings will ask themselves what they really value, what is really important. We believe that the general public will now back our provincial government fully in its effort to effect a positive piece of legislation at this coming Spring Session which will safeguard the lasting productive values of our land. It is the reconciliation of the four principal elements of conservation, namely: preservation, protection, managed use, and restoration, that provide the guidelines for developing a solid and practical legislative base.

A citizen's right to a decent environment is a positive not a negative concept because high value is placed on the quality of environment. It is our hope that the new surface reparation legislation will restore environmental conservation to its rightful prominence in Alberta resource legislation.

Sgd/- Calgary Chapter
National & Provincial Parks
R. Clive Dinkley
2904 Parklane
Calgary 6

ARCHAEOLOGICAL SOCIETY OF ALBERTA
CALGARY CENTRE

4.10

c/o 3817 Seventh St. S.W.
Calgary 6, Alberta

BRIEF BY

D. B. Coutts

ARCHAEOLOGICAL SOCIETY OF ALBERTA
CALGARY CENTRE

IN REFERENCE TO

IMPACT OF STRIP MINING IN ALBERTA

December 21, 1971

ARCHAEOLOGICAL SOCIETY OF ALBERTA

CALGARY
CENTRE

The Calgary Centre of the Archaeological Society of Alberta in co-operation with the Chinook Country Chapter of the Historical Society of Alberta,

In reference to the Impact of Strip Mining in Alberta
December 21, 1971

1. We wish to point out that our province is rich in historical and pre-historical remains, but that these remains are rapidly being lost. The public's awareness and interest in archaeology and history is rather recent and the surveys, collections and interpretations have only begun.

2. We wish it understood that we are not campaigning for the wholesale preservation of the remains, nor seeking needlessly to obstruct progress, but asking for the chance to survey and salvage possible sites before their irrevocable destruction, and the opportunity to preserve those sites of special importance.

3. For example:

    1) Development along the Kananaskis Valley already has obliterated or threatened some 140 known archaeological and historical sites.

    2) In the Banff-Bow River area there is evidence of habitation dating back to possibly 12,500 years ago. Four known pit house sites in the area are now gone.

    3) The Mt. Rundle area is the site of early trade routes affecting Western Canada.

4. We wish to point out that to be of value the surveys must be carried out at the earliest possible time, being either before or during the mine exploration program.

5. We feel that this can only be accomplished by a survey and salvage program and report being a part of the requirements of a work permit.

ARCHAEOLOGICAL SOCIETY OF ALBERTA
CALGARY CENTRE

6. We point out that the geographic areas of the foothills and mountains are more important than the plains area because the terrain concentrates the usable land and therefore the activity, both past and present.

7. We wish to stress that in addition to the quarry itself, the ancillary camp, access road and related operations have a major impact in areas of restricted accessibility.

    a) Ancient sites will probably be in the same location as present work and mining camps, especially so if close by a water supply

    b) Ancient trails and travel routes will probably be, at least in part, the same as present day work trails, roads, rail lines and pipe lines. Ancient sites are often along these routes.

    c) Sites are frequently found on the banks and benches of streams. Mining activity often affects the water courses by causing increased run-off or by altering for convenience. Increased bank erosion and channel shifting are major factors in the loss of these sites.

8. We wish to make it known that professionally trained archaeologists and historians are available at our universities and museums.

9. Historical and archaeological sites not only contribute to the richness of our Western Canadian culture, but also to the value of this area as an attraction to tourists. As such they should be part of the factors considered when the immediate returns for strip mining are being considered.

Your consideration of the points raised in this brief are accordingly respectfully requested.

D. B. Coutts
President

4.11

BRIEF

presented to the

ENVIRONMENT CONSERVATION AUTHORITY

by the

ALBERTA FEDERATION OF LABOUR,
C. L. C.

Calgary, Alberta
December 21, 1971
Presented by Eugene Mitchell

OPEIU 379

SURFACE MINING AND OUR ENVIRONMENT

Environment is defined as "the surrounding conditions, influences, or forces which influence or modify". Within this context there are physical, biological, social, physiosocial, biosocial and psychosocial factors. Thus, the all inclusive term, "environment", encompasses almost every aspect of life and living. The environment is ever-changing and throughout geologic time the earth has been subjected to a continuing change by natural forces. These natural land changes are neither new nor intrinscially bad; but to these natural changes a new dimension has been added--Man.

Surface mining frequently shocks the sensibilities--not so much by what is done as by the sheer magnitude of man's accomplishments. He literally has moved mountains, and some of his surface excavations are so vast as to resemble craters. Surface mining destroys the protective vegatative cover and the soil and rock overlying mineral deposits are frequently left in huge piles cast aside to despoil adjoining land. The end result has often been a drastic reshaping of the surface accompanied by an alteration of normal surface and sub-surface drainage systems. Massive landslides can and have blocked streams, waters can and have been polluted by acid sediment and litter, land areas isolated and its economic and esthetic values seriously impaired.

The face of the earth is dotted with abandoned worked-out mines, disfigured with quarries, riddled with derelict processing plants and piled high with ugly sterile banks of debris, tailings, waste and slag. In populated areas, their very existence fosters slovenliness and vandalism, invites the squatters and their shacks, and conjures up visions of squalor and destitution that can be erased only by cleaning up the entire mess. Dereliction breeds a brutish insensibility, bordering an antagonism to the loveliness and the life of the natural landscape it has replaced. It is a national disgrace.

In Alberta we are fortunate in that our pollution problems are not as great as in some other parts of the world. But if we refuse to learn from the mistakes of the past then surely we will have no right to complain when the pollution in our province begins to strangle us economically, physiologically and aesthetically. Surely the time to solve the problem is before it becomes unmanageable.

For the record, it is our position (and we are prepared to prove it if called upon) that surface mining affects the environment in at least three different ways. In varying degrees, it affects the quality of our air, soil and water--and through these, animal, plant and aquatic life.

Although surface mining may not be a major contributor to air pollution, the dust and vibrations caused by blasting and the movement of equipment, during construction and mining operations, can be annoying and, in heavily populated areas, a real public nuisance. In addition, some abandoned mines, tailing dumps and waste piles are a source of air borne dust.

With respect to soil disturbances, this is a greater problem than with air pollution. Following are some of the more obvious and disturbing phenomena:

a) Soil erosion;

b) Impacting of soil;

c) Sedimentation (in the pit) which interferes with the natural percolation of the water through the soil;

d) An alteration of the pH of the soil to the extent it may be lethal to most plant life;

e) An evacuation of the area by wildlife because of being disturbed or because of the hostile, barren or potentially lethal environment;

f) Access roads built of toxic waste material.

Our waterways, of course, probably suffer more than either the air or soil. Pollution can be caused by any one or several of the following situations:

a) Chemical pollution;

b) Excessive acidity;

c) Excessive alkilinity;

d) Excessive concentrations of dissolved minerals;

e) Oil spills;

f) Discolouration;

g) Sedimentation;

h) Debris.

Needless to say, most of the aforementioned conditions can create an environment which is lethal to fish and/or water plant life.

These, then are the three basic problems--air, soil and water pollution. Without appearing to dwell on the subject, we wish to point out that surface mining operation give rise to many related problems such as fire in abandoned coal pits, slides of waste piles, accumulation of waste debris and trash or rubbish, destruction of on-site timber diversion of natural streams, holes drilled, the danger of open pits being attractive hazards to children, the possibility of precluding the ultimate recovery of underlying minerals, etc.

Suffice it to say that wealth and power were built on the exploitation of our natural resources. The process makes a mess of the environment. In the past we have been content to leave the mess behind--either because it was out of sight and we didn't mind or because it wasn't worth the effort to clean it up. Now we are beginning to see that this rape and pillage of our resources are stumbling blocks to our prosperity and we are in danger of choking on our own filth. We are aware of the air and water pollution problems and have begun to take remedial and preventative action. But it yet remains for us to make a systematic effort to prevent more messes being made and left behind as mute testimony to greed and avorice. Let us now make a new and intelligent approach to the matter.

As Senator John Nichol, in an address to the Senate of Canada, stated:

> "The fight to save the natural environment will only be won if we are capable of a major and drastic change in the thought patterns which have governed man's existence on this planet until now. We have all been brought up to think that man owns nature, and we are now finding out that man and the natural world are of the same interdependent mix of life...." [1]

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1. Debates of the Senate, Vol. 117, No. 95, Page 1827

The position and policy of the Alberta Federation of Labour can be summarized by the following statement: "Not only our mineral resources should be considered an asset, to be used wisely and judiciously while there may be a demand for them, but the hole in the ground created by their extraction can and should also become an asset. The acknowledgement that there can and should be a valuable use made of a pit should be a major factor in planning for the development of an area or community where these resources exist. Up to now this factor has not been generally appreciated or accepted but there now seems to be a growing awareness amongst members of the government, resource industry and planners that some success has already been achieved in other parts of the world. We now know that something can be done. While we don't know enough about the probable costs of such undertakings, most of us know how great are the costs of doing nothing."

Let us elaborate. It is our contention that the conflict of interests that surround the problem of mineral land use must be resolved in such a way as will maximize the utlization of all of the province's resources and yet minimize the objectionable economic and sociologic after-effects of mining; all the while the final objective should be to enhance the value of the mined-out area and if this is not possible, then to minimize the degradation of our environment.

To this end we recommend that:

a) The government set standards and reclamation requirements for the conservation, reclamation and enhancement of surface-mined areas regardless of ownership.

b) The government enact legislation and regulations and provide an adequate enforcement agency to ensure that the costs of reclaiming mined lands will not be a financial burden to be thrust upon the public. This is especially important when the mineral is for export purposes and the consumer obviously has no interest in protecting, preserving or enhancing the quality of our environment.

Such proposed legislation should provide for, without being limited to the following:

(1) Measures to control the harmful effects upon the environment during, following and in preparation for mining;

(2) Specific provisions for (a) preservation of the quality of surrounding water, (b) control of elimination of soil erosion, (c) elimination of safety and health hazards, (d) full utilization or conservation of natural resources other than the mineral to be extracted, (e) preservation, restoration or enhancement of natural beauty and ecological usefulness of the area in question, and (f) standards requiring that access roads be soundly built of acceptable building material;

(3) Issuance of permit or license to surface mine with severe penalties for mining without such license;

(4) Mining operators to submit acceptable mining and

reclamation plan with the plans being subject to reasonable time limits depending on the extent of mining operation;

(5) Faithful performance bonds, sufficient to cover cost of reclamation, to be posted by mine operator;

(6) Forfeiture of performance bonds to involve the denial of future permits or licenses to company or corporation or its affiliates, subsidiaries or successors;

(7) Funding to provide adequate inspection and enforcement staff;

(8) Progress reports from mining companys;

(9) Provisions for the disposition of all refuse and waste created by mining operations;

(10) Penalties for failure by companys to comply with such legislation.

c) Research findings should by synthesized, centralized and made available through use of an efficient retrieval system. Where necessary, further research should be undertaken in at least the following categories:

(1) Revegetation of reclaimed areas;

(2) Chemistry of overburden and spoils;

(3) Hydrology;

(4) Earth movement and placement;

(5) Haul roads--designing better and safer access roads for future uses;

(6) Potential land use--finding the best use for reclaimed land, consistent with geography of mined land, its local uses and needs, etc. In this respect, some suggestions might be (depending on location and needs):

- (i) pastureland or farm acreage;
- (ii) golf course or play ground;
- (iii) artificial ponds and parkland;
- (iv) artificial wetlands to replace those drained for other uses;
- (v) storage area for grain, lumber, chemicals, oil, etc.;
- (vi) outdoor theatre--golf driving range;
- (vii) race track;
- (viii) parking area or building space.

The possibilities are endless and obviously give a very good indication of the great benefits that can be derived from intelligently planned multiple land use. As an aside, it might be pointed out that access roads, if properly maintained, can be used to good advantage in promoting multiple land use. Accessibility for fire protection, recreation or tourism can mean the difference between use and isolation and surely it doesn't make sense to isolate an area when it could be put to good use.

It may well be that there are those who will argue that we in Alberta have an abundance of land for all uses and it is therefore foolish to spend time and money on something we already have. To such a suggestion we have two replies: First, our mineral resources are not renewable--once gone we can never replace them and to us it makes emminently good sense to assure ourselves that the money realized from the exploitation of our minerals will not only provide a few extra jobs while the resources are being mined, but more work will also be generated in reclaiming the land and preparing it for future economical use. Secondly, let us not be so shortsighted that we fail to realize that the number of recreational areas left in North America is very limited as a mushrooming affluent population with more and more leisure time is placing an ever heavier demand on available recreational areas. In the very near future, we may find ourselves unable to meet the accelerated demands placed on our parklands by all of North America. We must now prudently prepare for tomorrow--or pay the price.

A dollar spent to assure the prevention of future damage can be many times more effective than a dollar spent on restoration of land damaged in the past.

As we quoted earlier, the fight to save our environment will only be won if we are capable of a major and drastic change in our thought patterns. We are all aware of the facts of the matter. We all profess to be concerned about these facts. One question remains to be answered--"Do we have the intelligence and the fortitude to make an objective analysis of the facts and conclude that we must indeed change our thinking and do those things that will ensure our survival as a society with a viable economy operating in the best interests of the people of our province and country?"

> "As long as we reagrd environmental faults as merely faults to be corrected while we pursue goals which do not include environmental quality, we shall continue to pile up new problems that may be insoluble before long. Indeed, it might be appropriate to set "survival" as our main goal because that would focus attention on the need for stability--a healthy environment in perpetuity. It might also suggest that, at least in the methods of their achievement, some aspects of the other goals may require a major redirection of emphasis if we are to maintain a healthy environment." [2]

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2. Special Study No. 15 of the Science Council of Canada

4.11 QUESTIONING BY THE AUTHORITY

DR. STUART SMITH

Mr. Mitchell, you lean very heavily on environmental quality and there will be some costs which we all must bear to achieve this. Do you see any conflict from the viewpoint of the Federation in terms of employment, as we are using our resources?

MR. EUGENE MITCHELL

There is always going to be a conflict. Talk about preserving the environment versus creating jobs. The big problem of the work force today is that, while they are concerned about the environment and the quality of life that they have, when jobs are done away with, there are no teeth presently in legislation that protects the worker that is displaced. He presently has no right to negotiate on matters of environmental health and matters that affect job displacement, this type of thing.

DR. WALTER TROST

Has the Federation any view on strip mining as against underground mining, again from the position of the number of jobs available in the two approaches?

MR. EUGENE MITCHELL

We are not saying that strip mining shouldn't be carried out. There are areas of the province where it definitely should not be carried out. I think if proper research went into these things ahead of time, especially in areas where it is going to affect the watersheds, then strip mining shouldn't be allowed. Undoubtedly there are areas that can be strip mined without any great damage and there are all kinds of reclamation programs that could be carried out in conjunction with it.

4.12 THE ENVIRONMENTAL IMPACT OF SURFACE MINING IN ALBERTA

Presented by: Colin M. Mitchell, P. Eng.

These observations cover the broad aspects of strip mining, with a comment in the form of a word of warning on the indiscriminate adoption of regulations affecting operation and taken from a place as different as the suggested Appalachian Region. The concluding remarks will be a list of questions for the Authority to use in finding its answers, so that our governmental decision-making processes can indeed be helped to meet the requirement of a modern and progressive society.

Briefly, strip mining as we know it (and not to be confused with quarrying or open-pit mining) is a modern technique originally based more on economic or financial considerations than on good or even acceptable mining practises. In other words, it was a development brought about by trying to get the most for the least, to try to keep a dying industry alive in a highly competitive situation. It saw the development of gargantuan machines for the stripping of overburden, coal removal, and coal haulage processes, and each was based on the low cost per unit theory. Much had to be learned in the construction and the efficient use of the machinery, as well as the development of manipulative skills and the understanding of the materials to be handled in very large quantities. As a result many things were done to try to ease the operating costs of these specialized giants that would not have occurred under less pressing or hectic circumstances. In many cases they were disruptive to nature and the ecology for purely pecuniary reasons.

The outcome of this was that the Appalachian Region, which is rich in coal, was subjected to all the trials, tribulations, mistakes and oversights of a new evolution. The coal bearing, mountainous formation that traverses the most densely populated area in America, has many good reasons for complete preservation in its pristine state. However, the rich coal deposits of the Appalachian Region built a nation of industrial wealth that is unequalled anywhere.

Its development did bring about many conditions that were undesirable in a practical and aesthetic sense. Nevertheless, these lessons have been learned and many of the preventive and corrective measures are already in effect in Alberta.

Never in the history of man has the perfect solution to any problem of complexity, or to that of an evolution, been derived on the first attempt. In some instances it has taken many decades to achieve only a reasonable compromise.

It might be well to remind everyone at this point that when nature changes her mind, there is no compromise; there is only adaptation or extinction.

And now to the specific. It must be understood that there are a few basic differences between Alberta and the Appalachian Region. Modern strip mining methods tend to be custom designed to the structure to be mined. Good mining principles, properly applied, usually bring acceptable results. Such things as contour mining minimize erosion processes. The fact that coal is black may be objectionable to some, however, it is an irrevocable fact. Surface restoration is practical but it cannot be had for nothing. It is being done at present and apparently satisfactorily.

And finally, one of the major public criticisms in the Appalachian Region is the contamination or pollution of the watershed by mine drainage water. Eastern coals tend to be high in Pyrites, which are compounds of sulphur, and mainly in the ferro series or form. These are subject to transformation into the sulphuric form, which is acidic, by exposure to the air. This is a source of pollution that is difficult to contain but which does not exist to any degree that is significant in Alberta. Exceptions to this will be very rare.

Many impressive publications on water pollution emphasize this condition of acidic mine drainage without any qualification as to location. As a result the idea that all mine drainage is acidic has been given wide distribution and has gained recognition by those who are not acquainted with mining. Recent checks on several sources of mine drainage in Alberta show that the drainage from our mines is chemically neutral, more or less, and is not therefore, to be considered as a pollutant for this reason.

In summary then, we would suggest that any regulations to be enacted above and beyond the existing Mines Act be cognizant of the factual conditions and not adapted from another region without realistic and knowledgeable analysis.

Gentlemen - I believe we can say without fear of contradiction that there is nothing as hard to erase as an error in regulatory legislation - be it for any reason, and this includes the ogre of over regulation.

In concluding, it would seem fair to ask the Authority a few questions to which we would expect answers, and they will contribute to the decision making process:

1. What are the real problems of this region which have brought about these hearings and presentations?

2. How does the Authority see the systematic analysis of these presentations as being helpful?

3. How will the presentations be used?

4. How will the results of these presentations manifest themselves? and who will pay for any changes brought about?

If the Authority can ask for suggestions and provide answers to these kind of questions, we feel that the public interest will be served by way of a better state of public awareness and understanding amongst all concerned, and in a balanced way.

Note: The word "Authority" refers specifically to the Environmental Conservation Authority, Dept. of the Environment, Gov't of the Province of Alberta, Edmonton, Alberta.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

Is it your view that a system of reclamation and watershed protection can be carried out concurrently with sensible strip mining operations?

MR. COLIN MITCHELL

Yes. The only qualification I would put to that is that there is a very wide range of reclamation costs and these may not be compatible with the marketing conditions for any given area of coal development or mining development. So these can be selective, they can force certain areas to be non-productive.

DR. WALTER TROST

Granting that our situation here is quite different than other coal bearing areas, we nevertheless have two very distinct areas within the province: one, mining in the plains for domestic use through the production of electricity; the other in the mountains for export for the most part outside of the continent. Do you want to make any comments?

MR. COLIN MITCHELL

The only comment I would make on the two separately is that the two types of coal have a distinction. The prairie coals, generally speaking, are much more adaptable to domestic use because of their lower heat value and also their higher ash content; whereas the mountain coals and the foothill coals suit our export market much better and their coking qualities are different. So these coals are very much better for export of special use.

DR. STUART SMITH

Did you infer that reclamation or protection of the environment in general, could be carried out under the present laws as they exist in this province?

MR. COLIN MITCHELL

Some of the mining operations are doing this and to my knowledge, they are doing it to the satisfaction of the mining authorities.

DR. STUART SMITH

If there are changes in the law do you think it's legitimate the public should have an input to these laws?

MR. COLIN MITCHELL

I think that the public should have an input to any law but I don't think that they should have an input to overly confining regulations, this is what my warning is.

DR. STUART SMITH

You don't think it's a free public choice to decide what they do with their own resources?

MR. COLIN MITCHELL

I don't object to that, but I do object to over-regulation to the point where it becomes restrictive.

MR. PAUL BABEY

You mentioned that surface reclamation might be costly, particularly where you are in a delicate marketing situation where there are no margins. Who should bear the cost of reclamation?

MR. COLIN MITCHELL

I would hope that reclamation would be part of the final cost of the product. However as the developments of mines here and there become more expensive, if this particular item does interfere with the marketing of coal particularly in the foreign markets, then it becomes a toss-up of whether the actual mining company can bear these costs.

MR. PAUL BABEY

Are you suggesting that someone else pay for the cost?

MR. COLIN MITCHELL

I am hoping that in every instance the developing could pay them.

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STRIP MINING HEARINGS – BRIEF PRESENTED BY JANE McGREGOR (ECO–CENTER)

The most important questions we have with regards to Strip Mining are: Is it necessary now? Exploitation of surface minerals is inevitable, which for various reasons, is due to the present day philosophy based on a quick buck; or is it because the Strip Miner feels he is not only taking the minerals in a very lucrative manner (and I can't blame him) and realizes the limit of this energy supply...whereby he must invest this capital to accumulate the monies which will be needed when the surface supplies run out and deep mining will again be the source of coal energy resources.

Strip mining is only a small part of this whole system of human evolution – we have been on this earth for $3^{10^{6}}$ years as thinkers. We lived here for the earth, we lived with the earth, and now the Earth is here for us. But how does this account for man's survival 100 years from now? Resources are finite – energy can neither be created nor destroyed – so where does all this energy go from burning coal – it goes into a form which is spread out in the air, it is dissipated in a form that will be economically "hurendous", and also a technological feat to recover and reuse.

The subject has unfortunately turned into an emotional one – emotional impact seems to be one area where our highly evolved intellectual mechanisms depart and in its void a haphazard mentality appears. Why can't you people realize the point which should be concerning you? The whole thing is a cop–out for our schizophrenic philosophy on life. Strip Miners are here. They must realize this isn't a forever venture. They are probably

The Eco-Centre is a project of the Calgary Eco-Centre Society, a non-profit, volunteer organisation registered under the Societies Act of Alberta. The Centre aims to provide the public with information on environmental problems and solutions and can be visited or contacted 9 am - 5pm, Monday thru Saturday.

willing to pay the costs of reclamation, but the people who complain are the people who look for a higher standard of living and have more kids and own more cars and live in the biggest houses (with the most advanced electrical appliances, ie. electric can-openers). They are the STRIP MINERS, OIL MEN, INDUSTRY WORKERS, UNIVERSITY PROFESSORS, SALES CLERKS, WAITRESSES, SANITARY ENGINEERS, FIREMEN, AND THE COP. So who's to blame for this cheap and easy rape?

This is just another demonstration of many the careless abandon or the obsession to which we apply our methods and our beliéfs to take what Mother Earth gives so readily. No, nothing has to be difficult, but the question is not Strip Mining. They're the whipping boys, and don't just look at them but look at yourselves and everyone else. Remember that we can do one of two things - slow down and live, or suffocate in our own defecation when Mother Earth can no longer supply us our rate with the things we THINK we must have.

The Eco-Center will be happy to receive and distribute all points of view from all concerned, but we will not take sides, we will not accuse an individual. We will accuse every Homo sapien who walks this earth until they make direct constructive and workable efforts to preserve its pleasantries for many, many, many generations to come.

Many questions must be asked and answered. A previous speaker referred to the reality that we need facts. I've seen facts - I have heard facts today which were not only biased and inaccurate, but were dangerous and misleading under the guise of true concern.

The Alberta Government will have to be responsible to regulate the Strip Mining ventures and the reclamation. If polluters must pay, then Strip Miners must pay. But there is a dicotomy - there is a policy of economic growth which will encourage population growth. Population growth encourages pollution in every sense. It is being encouraged by the Government and by industry, so why even bother with a hearing of this nature if you refuse to look at the obvious problem. Let's not fool ourselves anymore. We are responsible for now and for the future!!

My questions to the ECA are as follows: 1) What will you say in your report when you must account for the finite resources we are exploiting now? What energy source do you project for future generations? I feel that Dr. Kerr has an answer to one step - let's slow down. It is good and just though to have this hearing - the educational value is good, but it's not only snowing outside, but I detect quite a lot of snow in here. 2) Will there be provisions for study to regulate sale of our coal so that we shall be able to conserve as much as possible for the future? 3) Many of the coal men today have inspired reminiscence of my Social Work courses: Create jobs! Create economic growth! Create a quality of life! Why have you not considered your already said role in encouraging population growth? Now I ask, why not save your ulcer - share your jobs and salary with others?

To mining people - have you studied the feasibility of restoring the land with compositions which include organic compost from garbage and sewage sources? If not, why not? If so, what are the results?

QUESTIONING BY THE AUTHORITY

MR. PAUL BABEY

Are you advocating pollution control or population control or both?

MS. JANE MCGREGOR

You have to have both. In fact every person unborn is a potential polluter and every person on this earth right now is the polluter so that we have to have population control. I am very sad that the Alberta and Canadian governments have waived this very important thing.

MR. PAUL BABEY

Are you advocating zero population growth?

MS. JANE MCGREGOR

Zero population growth right now.

DR. STUART SMITH

Even if we had a very large propaganda program now it is unlikely we will achieve very many results for the next 30 or 40 years. How do you resolve the position that we live on energy? We are taking our resources out of the ground primarily for energy.

MS. JANE MCGREGOR

When you start thinking of population control and you start thinking of the energy uses that people have now, then you have to start thinking in terms of a new philosophy on life. We can look around today and we can all think of what we have had for dinner and what we are going to have for supper and how much gas we are going to burn up in our car. Probably some people have even got the audacity to have their cars idling out there. I am thinking in terms of people being wise about the energy they are using. Because I do have some faith in technology and I do think that if we can preserve our energy resources for as long as possible, perhaps future generations will have a chance.

4.14

STATEMENT SUBMITTED BY

CONSOLIDATION COAL COMPANY OF CANADA

TO

ENVIRONMENTAL CONSERVATION AUTHORITY

PROVINCE OF ALBERTA

CALGARY, ALBERTA

December 21, 1971

Submittor: M. S. Cholach
Exploration Manager

INTRODUCTION

The Consolidation Coal Company of Canada maintains exploration and project development offices in Hinton, Alberta. The Company also is a 50% owner of Cardinal River Coals Ltd. at Luscar, Alberta. The remaining 50% is held by Luscar Ltd. as outlined in the brief which Mr. George Coates presented to the Authority in Edmonton on December 17, 1971. Mr. Coates effectively expressed the views of Cardinal River Coals and our statement consequently will deal with other matters. We will concern ourselves with technological advances in exploration, and with certain segments of the proposed legislation.

EXPLORATION METHODS

Consolidation Coal Company began its exploration activities in the Alberta foothills during 1967 using conventional methods of exploration. The coal measures in this area are extremely difficult to evaluate because of folding, thrust faulting, and in some cases overturning of the beds. By 1970, it was recognized that these complexities necessitated the investigation of alternative exploration methods. Geophysical techniques experimented with included resistivity, magnetometer, E.M., Gravity, and induced polarization surveys. Another alternative method tried was false-color infra-red aerial photography. All of this experimental work was done in areas of known coal occurrences to confirm the validity of the method being employed.

Of the various methods tested, induced polarization most frequently produced the best results in locating coal outcrops. To date, the induced polarization technique has resulted in a better than 50% success factor in our foothills exploration. The greatest difficulty with this method has been to decern between coal and non-coal anomalies. We consider our degree of success experienced with the induced polarization technique to be satisfactory for our purposes. More importantly, it has appreciably reduced for us the amount of drilling required and has virtually eliminated trenching as a method of coal exploration. The induced polarization equipment we utilize is portable and is carried on back-pack units by a four-man crew. The portability feature of this equipment frequently makes it unnecessary to build access trails for drilling equipment. *It must be emphasized*, that this technique may *not have application under all circumstances*. Further, when favourable results are achieved from an induced polarization survey, these can only be considered as *indicators* of coal occurrences and *must* be closely followed by drilling.

The apparent success of the induced polarization technique would not have been obtainable had restrictive legislation been imposed. It is our feeling that maximum flexibility in exploration, mine planning and development must be retained by the industry so that it can take full advantage of technological advances as they occur.

LEGISLATION

Concerning the specific points of legislation, the Consolidation Coal Company feels that public debate in the legislature in matters of resource allocation is unnecessary. After appropriate legislation has been inacted by the legislature, the interest of the people can best be served by open hearings on matters of public concern.

Section 3.3 CONSOLIDATION OF ACTIVITIES AND SEQUENCES

The administration and interpretation of the many existing acts relating to the protection of the environment are confusing. We are now required to work with numerous divisions of several departments within the government charged with the responsibility of enforcing these protective acts. We agree with the Authority that the administration of these acts should be centralized under the jurisdiction of one governmental body.

Section 4.023 EXPROPRIATION OF SURFACE AND SUBSURFACE RIGHTS

We are gravely concerned about the serious implications in the concept of expropriation. If the proposed legislation is to be administered in an equitable manner for all, then it must be applied equally to all industry that disturbes the earth's surface in conducting its activities including oil and gas, mining and quarrying, forest industries and agriculture. It should be the objective of the legislation to adequately control the environmental impact of any proposed action so that such an inequitable and stringent measure as expropriation need not be necessary. As an alternative to expropriation, it is conceivable that there are areas in the foothills and mountain regions that possess little or no mineral value, yet have a unique natural appeal. Is it not possible for industry, government, organizations, and the Research Council of Alberta to mutually agree upon such areas for reservation as wildernesses?

Section 4.11 RETROACTIVE APPLICATION

We see no basis for holding a company responsible for the actions of a previous operator.

Section 4.15 PENALTIES

The provision for financial penalties and imprisonment for violators of the proposed act is simply not necessary. The legislation has provided for security deposits to ensure that funds would be available for the reclamation in the event of default by the operator. The legislation further provides for forfeiture of these security deposits in the event of unsatisfactory or incomplete implementation of the reclamation plans. Surely, these provisions give the province adequate protection.

In conclusion, the Consolidation Coal Company is willing and able to cooperate with the Authority in drafting effective legislation to protect the environment, which will at the same time give industry a workable base from which to develop the natural resource of Alberta.

Thank you

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

Your introduction of exploration techniques that are both more successful and less damaging to the environment was interesting. The induced polarization technique, is it suitable in our low sulfur coals?

MR. M.S. CHOLACH

We are using this technique in our low sulfur coals.

DR. TROST

Would the presence of pyrites adjacent also give you a reading on your induced polarization measurements?

MR. M.S. CHOLACH

At the present time I don't feel that the theory of induced polarization can be adequately explained. We really do not know what makes it work. There are a number of possible theories: (1) the oxidation of pyrite within the coal seams, (2) the membrane effect where the immobility of the cation is increased relative to the anion, (3) it may be a combination of these membrane effects.

DR. WALTER TROST

Are you fairly sure that it is working?

MR. M.S. CHOLACH

We have accumulated a considerable amount of information during this year and we are relying almost entirely upon this method of coal exploration.

DR. WALTER TROST

Have you a slide that you would like to show us, on it?

MR. M.S. CHOLACH

Yes. Before we start a project we do some mapping and we utilize all the existing geologic information that's available. This particular area that we consider for exploration, we do not have very much information about. There are very few outcrops and there are only two known coal occurrences; the one indicated by the Y in this end, and by the XC in the lower left. We know there is a slight displacement in the formations and these would imply the presence of faults. One would be very tempted to connect those two coal occurrences and assume a fairly continuous outcrop. On the basis of our mapping and information, we would submit a drill plan to the Department of Lands and Forests. The vertical lines that you see show the proposed drill sites. Normally we would not drill all of these lines, we would probably drill the one on the far left and the extreme right and follow it up by the line in the middle. However, if we run induced polarization surveys over these lines we can use this as a guide in our drilling. An induced polarization profile appears in the centre series of lines and the lower line. This is what we wish to emphasize, that on every project the response to IP is different. It takes some orientation work before one determines suitable electrodes pacing to get a response. The top series of lines are resistivity surveys, you can see from the variations in the lines they are very noisy and they do not coincide with the anomalies or with the locational coal seams below. The second series of lines are IP lines and there we have employed various electrodes pacings and the line in yellow appears alone in the lower profile. You can see where the coal seams are located, we have very definite highs or chargeabilities. The peaks that appeared on the last profile showing anomalies as indicators of coal, we have done further work and we are still doing this research. We are running decay curbs over these anomalies to see if we can differentiate between coal and non-coal anomalies and so far our research has been inconclusive. This slide, going back to our first one where we showed our drill lines, this is what one could expect in the running of IP. The green rectangles represent IP anomalies, the dark lines represent the outcrops of the coal seams and you will note in the lower left there has been intense structural deformation with a series of folds. In the upper right there has been a repetition of coal seams by thrust faulting and it is this complexity that led us to experiment with these geophysical techniques. I should add this represents a case history, the area in the lower left was first drilled by outcrop drilling, the coal seams in the upper right were located by induced polarization.

4.15

SUBMISSION TO THE ENVIRONMENT CONSERVATION AUTHORITY ON THE ENVIRONMENTAL IMPACT OF SURFACE MINING IN ALBERTA

UNIFARM
9934 - 106 Street,
Edmonton, Alberta.

Presented by:
R.J. Page,
Vice-President,
December 21, 1971.
Calgary, Alberta.

Mr. Chairman and Members of the Environment Conservation Authority:

As representatives of the custodians of much of the surface of this province, Unifarm must emphasize the need to preserve and even improve, where possible, our greatest resource - the land itself.

We recognize that resource development is a major part of our economy, but we believe strongly that the interests of the rural communities, our agricultural, hydrological, recreational and aesthetic values must not be sacrificed in the interest of such development.

Examination of maps indicating recoverable resources (particularly coal) in Alberta, their location and extent, along with the apparently growing demand for coal leads us to believe that vast areas of agricultural land will be subject to disturbance in the foreseeable future.

We support what appears to be deep concern on the part of government and other agencies and individuals for reclamation of areas affected by surface mining. We would, however, place strong emphasis on the need for a more complete form of reclamation - that of the rural community.

The Rural Community:

Surface mining in the plains area of this province is carried out on the farms and grazing lands of Alberta food producers. Displacement of farmers and ranchers by mining operations tends to impoverish the communities affected, and by so doing, further accelerates the exodus from the rural community. Those who remain are either left without certain essential services or are forced to obtain them at prohibitive costs.

It may be argued that the mining operation would offer the rural community economic benefits to offset the loss of agricultural resource. Even if this is true, these benefits which tend to be short-termed, cannot be compared with the long-term contribution to the community made by agriculture, which is based on a renewable and continuing resource, the productivity of the soil.

Agricultural Soil:

Our organization is also concerned about the effect of surface mining on the soil itself. In areas of light soil, where the ecological balance is delicate, there are likely to be serious problems of erosion before plant life can restore stability. The degree of success to be achieved in restoring farmland to its original productivity is likely to vary from one area to another, as will the cost of doing so. The biological nature of the topsoil will also be subject to change. It is obvious that careful attention must be paid to all these factors before surface mining operations are undertaken.

Ownership of Reclaimed Land:

In our view the question of future ownership of Alberta's agricultural land must also be taken into account. The amount of land removed from agricultural production for surface mining has not given reason for deep concern up to this time. Looking to the future, however, it is possible that with the population growth, the growth of urban centres in Alberta, and increased demand for food from many parts of the world, fertile land will be a much more precious resource than it appears to be today. The question is who will farm the land which we must assume will be reclaimed?

Unless careful pre-planning takes place we could be, in effect, forcing mining companies into production of food and fibre, since reclamation of farm land would be incomplete, if it were not followed by cultivation. A means must be found to ensure return of the reclaimed land to individual farm producers.

Water Resources:

Ranchers in the foothills area of the province and farmers who irrigate their land share the concerns of urban centres for the future of Alberta's water resources rising in the mountains and foothills, both in terms of quantity and quality. The impact of surface mining on streams and rivers has already been felt in some parts of the province. Deterioration of this vital resource cannot be tolerated.

Water resources in the plains region must also be safeguarded. Wells may dry up as the result of exposure of underground streams by the excavators. Fresh water ponds and lakes may be endangered as drainage patterns from alkaline soils are altered. It must be remembered that a good supply of water is essential to most forms of agriculture.

Recreational Resources:

There is a growing demand for reasonable access to unspoiled areas of natural beauty. Our organization has a special interest in the Clearwater Forest Reserve area, where we have developed Goldeye Lake Centre as a Youth Centre. Indiscriminate developments in surface mining in adjacent areas would eliminate the advantages sought in choosing the location.

While this area is of special interest to us, we wish to make it perfectly clear that the recommendations which we make in this presentation are not intended for that area alone.

RECOMMENDATIONS:

Unifarm recommends the following:

(1) THAT surface mining be permitted where conditions are favorable to the success of reclamation, but discouraged where they are less conducive to success, or the long-term future of the local community is threatened.

(2) THAT, in the interest of preservation of the rural community, progressive reclamation be practised in any surface mining operation in the plains area to make the land available for agricultural production in the shortest time possible.

(3) THAT regulation of surface mining operations take into account regional differences in regard to ecology, types of soil and land use.

(4) THAT landowners have the clear option of selling land, or leasing it to coal or other producers with adequate assurance that progressive reclamation of a regulated high standard be carried out. The cost of such reclamation should be considered part of the cost of production of coal, or other resource.

(5) THAT land purchased for the purpose of surface mining, following required reclamation be offered for sale at then current market prices within a given period of time following reclamation. The period of time should be determined by factors such as soil type and future land use.

(6) THAT the removal, storage and replacement of top soil and overburden be carried out in such a manner that water resources be safeguarded from loss through sedimentation, diversion or chemical change.

(7) THAT in cases of expropriation for purposes of surface mining, full consideration for compensation be given to the economic effect of reduction of the size of the affected farm unit.

(8) THAT, in the interests of preserving unspoiled areas of natural beauty for recreation purposes, recreation corridors with reasonable access be established. As a specific example we recommend that a "Natural Recreation Corridor" be established starting at a point on Highway 11, thirty miles west of Rocky Mountain House, and continuing to the Banff National Park boundary. We recommend further that this corridor be twenty miles in width, with the highway as its centre.

(9) THAT exploration and mining not be permitted within a seven mile radius of any exceptionally scenic spot (such as a waterfall) or educational or recreational facility already established.

Respectfully submitted,

UNIFARM

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

Your submission brought up the impact of surface mining on rural communities. You are implying that if farms are taken out of production by improper or insufficient reclamation that then there is a gradual decrease in the livelihood and the resources of that particular area. Would you like to elaborate?

MR. R.J. PAGE

Yes. This is one of our concerns. Take economic unit, a farm of 640 acres and unknown to the farmer there is coal under this land. They would come along and they would want this to be developed. Probably he didn't want to give it up, maybe the land would have to be expropriated. In this case he would then lose a half section or 200 acres or something. He would then no longer have an economic unit and this would make him leave that farm or sell what he had left to somebody else. This would actually be a further drain on the rural community as we feel it as being brought about by the development of industry. One of our concerns is that they should be compensated, the other thing of course is that we feel very strongly that the land taken out of production, if it is fertile land, should be put back to as near as possible a farming condition again at the termination of its use by the developers.

DR. WALTER TROST

If the land is not put back into productive use, will not only the individual farmer but the whole community suffer a deprivation?

MR. R.J. PAGE

The community itself will naturally have less population and there will be fewer people to pay taxes, fewer to pay the utilities and this sort of thing, and the cost in the area will become higher to the individuals.

DR. WALTER TROST

How would the person who will use the land after it is reclaimed be consulted?

MR. R.J. PAGE

We feel that agriculture is an industry that should be retained by the farmers of the province and our organization has been opposed to other types of industry getting into agriculture. Certainly we feel that the farmers have been good custodians of the land. We sometimes question whether industry can take care of land the way the farmers have done.

MR. PAUL BABEY

In terms of the lone-term productivity of the soil, is it your view that following reclamation and the growing of legumes, that the soil can be restored to its original productive capacity at a fairly rapid rate?

MR. R.J. PAGE

This depends on the ecology of the soil. In some areas it can be brought back fairly quickly, in other areas it cannot. We do have areas of very thin topsoil and once this is disturbed it is very hard to bring that back into production. Where we have heavier soils and more topsoil, you can bring that back into production more quickly. It varies according to different areas and types of soil.

MR. PAUL BABEY

Are there some areas in the plains that cannot be brought back?

MR. R.J. PAGE

I would think that we'd have to take into consideration the Suffield area, or somewhere in the southeastern part of Alberta where we do have very thin soils and where the vegetation is sparse. You would have trouble trying to get re-established and that sort of thing.

MR. PAUL BABEY

You suggested a natural recreation corridor.

MR. R.J. PAGE

Yes. In our recommendation that there be a corridor approximately 30 miles west of Rocky Mountain House. The terrain there is very scenic, and our thinking is that in such areas we should be taking a serious look at setting up corridors where mining and spoiling would be prohibited.. We feel, for recreation and tourism, it would be a pity to destroy this sort of land.

MR. PAUL BABEY

You suggest a seven-mile radius also.

MR. R.J. PAGE

We would certainly like to see it 20 miles wide but as a last resort down to seven. We do have other areas where we feel the scenery should be preserved and you would have a seven-mile radius. This afternoon we had one gentlemen who felt that one mile was enough but certainly I don't think that one mile would be enough to conserve some of our beautiful sights that we do have in the mountains.

MR. PAUL BABEY

Your proposal then is for the corridor looking at the potential of this area being somewhat similar to Banff or Jasper?

MR. R.J. PAGE

Right.

DR. STUART SMITH

Do you have some specific concern about the Ram River or the Bighorn River, some specific areas that you might be aware of that are under active consideration for surface mining?

MR. R.J. PAGE

Not at the moment but we do know that there is coal there and no doubt they will be wanting to develop it.

ALBERTA WILDERNESS ASSOCIATION
4.16 PRESENTED BY GRANT MCNABB

December 21, 1971

"A Brief on Strip-Mining"

The Alberta Wilderness Association, an organization dedicated to the preservation, conservation, and wise use of Alberta's wilderness and wildland habitat has prepared this Brief on the question of "Strip-Mining" in response to the announcement of the Environment Conservation Authority dated 16 November, 1971. While we welcome this opportunity to present our views to the government in public forum, we believe the Authority has allowed too little time for preparation of Briefs by the public on this very important topic. We also note that the Authority has chosen to concentrate on "all aspects of reclamation and restoration" while apparently ignoring the very important question of "whether or not mineral and energy resource development by strip mining should be allowed at all on certain areas". For some areas other uses, including recreational uses, can be shown to possess real and intrinsic value to Albertans. The benefits from these other uses may be equal to or perhaps greater than the "benefits" which may accrue to Alberta from exploitation of subsurface mineral and energy resources.

We have chosen today to discuss this "question of uses", ignoring for the time being the question of "reclamation and restoration". This does not imply that we believe there to be "no problems" in the areas of reclamation and restoration, rather, we believe the first priority is to define those lands within our Province where exploration and exploitation of the mineral and energy resource may be incompatible with continuing use of the surface resources. Where conflict is apparent, the fate of the land should be decided only after public debate, and on a logical and rational basis. All benefits and costs that may accrue from resource exploitation must be considered against the benefits (both current and potential) and costs of other uses (including recreational) to which the land may be put. Benefits and costs should include not only those of an economic nature, but also those of a social nature. Each land area must be considered on its own merits. The decision should take into account not only short term costs and benefits, but also those of a long term nature, i.e. those which will affect our children and their children.

We are aware of the position statement put forward by Alberta's Department of the Environment on the "Philosophy, Concepts and Principles" around which legislation on surface reclamation will be developed and are in general agreement with the proposals and conclusions reached within this enlightened statement. However, we believe that greater emphasis should have been placed on the possibility that other resource uses, including recreational uses, must be considered as alternatives to exploration, development, and operation of extractive industry.

At the present time we do not have a clearly defined and sound land-use policy, nor do we have within government a mechanism whereby the benefits to the public which may accrue from one or another form of resource use may be "weighed in public". Because of this the Alberta Wilderness Association requests, in fact pleads for, a moratorium on any new coal development projects within the Foothill and Mountain Regions of Alberta. This moratorium must include those forms of exploration which would involve the building of access roads or the creation of other forms of surface disturbance if the area in question is currently roadless, possesses wilderness or wildland attributes, or constitutes a critical grazing range for native species of large mammals. The moratorium should remain in effect until such time as the Provincial Legislature can present to the public a clearly defined and sound policy with regard to land use in the foothills and along the eastern slopes of the Rocky Mountains. Such a policy should be preceded by draft proposals which will be subject to Public Hearings and discussion.

Beginning now, well before presentation of such a land-use policy to the public, the Department of Lands and Forests should begin an immediate inventory of all lands within the Province that might qualify as scientific or recreational wilderness areas. For inventory purposes "wilderness" should be defined broadly, and the presence of man's works need not be a disqualification at this early stage. Within the proposed land use policy should be allowances for the setting aside of wilderness areas for recreational and scientific uses, recognizing that man's use of an area as "wilderness" precludes other uses. The sole use of a specific area for wilderness could however, be part of a "multiple-use" plan for a region. Other recreational uses may well be compatible with resource development, including certain uses which are normally associated with "wildland" if said development is executed with "care", public access is well regulated and in certain cases limited (i.e. access by motorized vehicle for recreational purposes prohibited). Planning such as this might allow Albertans to "have their cake and eat it too".

Thus, coal development would be allowed, but only in certain well-defined areas, these areas having been chosen on a logical and rational basis after being subject to public debate and discussion. Where allowed, such activities would of course take place with protective features that insure minimum land and watershed disturbance in order to afford the maximum protection to our fish, wildlife, and other recreational resources.

Given then, the need for such a "Land Use Policy" we would like to discuss in some detail the basis on which policy-making decisions should be made. One important factor will be the market for Alberta coal. The volume of coal currently being mined in Alberta is approaching 10 million tons per year. This magnitude of development is negligible in comparison to the possible development which could occur over the next twenty-five years. It may not be unrealistic to anticipate a 5 to 10-fold increase in production rates during this period. Ultimately the value of coal produced in Alberta could exceed the value of oil presently being produced. Guidelines established in the next several years will have a profound effect on the environment and the future well-being of Albertans.

Even at a production rate of 100 million tons per year Alberta coal reserves are estimated to be adequate for 500 years. We do however, recognize that the economics of extraction currently limit the use of all but a small portion of these immense coal reserves. However, we believe that every effort, including the expenditures of research monies, be made to more intensively mine those areas already committed to development before authorizing any new developments. Adequate environmental controls could more effectively be established and could be carried out more economically. A needless proliferation of development sites must not be allowed. The fact that an industry has already spent monies on exploration of an area should under no circumstances be considered an argument for development of mining in said area. Rather, it is preferable that the company be reimbursed from the Public Treasury than an initial mistake be compounded.

We are aware of the complex economic situation involving the mining and transportation of large volumes of material such as coal, and recognize that in the past public subsidies have been used, especially in the provision and maintenance of transportation facilities. We would consider the use of public monies in the future for the development of transportation facilities to new sites to be an unwise, and even immoral use of public funds. Rather, if subsidy is to be given to the industry, it should be an open subsidy and should be applied to areas currently under development so that more intensive mining may be used to meet the market needs. It is ridiculous for Alberta to allow, much less encourage, the initiation and development of new mining locations within the foothill and mountain regions if intensification of mining at sites presently under development is feasible.

If the costs and benefits of proposed coal developments are to be weighed against the costs and benefits of other land uses in making policy decisions the public and the government will need to have additional information made available. Just what are the economics of development for an extractive industry such as coal mining? What portion of the capital investment goes to machinery made outside of Alberta, or even outside of Canada? How many new jobs are made available to Albertans for each dollar of invested capital. What is the economic multiplier factor for extraction and transportation labor relative to other industries which might exist in lieu of coal mining (i.e. the lumbering, grazing, and recreation industries)? Will the initial or maintenance cost of transportation facilities require subsidy by the taxpayer? Can the industry truly make a profit if damage to the environment of adjacent areas and reclamation costs of the mined areas (estimated by some to be in excess of $5,000/acre for adequate restoration) are internalized? These are not moot questions and the answers to these and other contentious questions must be provided before policy decisions are made.

The Alberta Wilderness Association has extreme reservations with respect to strip mining activities within the mountainous river headwater areas. The deep winter snow accumulations are the source of most of the summer flow in the prairie river systems. The soil and vegetation cover are highly susceptible to any physical disturbance. Consequently when even a small portion of an upland area is destroyed the resulting effects are often far out of proportion to the area initially disturbed. While chemical changes in the water may not be critical as they are in mining operations in eastern North America, siltation of streams and lakes from access roads, the mining operation itself, and washing operations are detrimental factors of mining operations. The costs of these factors must be borne in mind when weighing the benefits of resource exploitation against other land uses.

It is almost a truism on the eastern slope of the Rocky Mountains that those areas possessing seams of coal readily accessible to stripping are also the most productive ranges, summer and winter, for Alberta's bands of mountain sheep and goat, as well as herds of elk. Destruction of this habitat, coupled with increased hunting and poaching pressures that accompany easier access threaten the very existence of these species as a renewable recreational resource. Aesthetics aside, how much is each big game animal worth to the economy of the Province? These figures should be available when land use policy decisions are made. Not only will habitat destruction be a factor, but in the case of elk, the location of at least one potential site for the stripping operation and an accompanying townsite would disrupt the normal winter migration from Banff National Park to the winter grazing areas.

We think that our government should recognize more fully that financial returns to Albertans from recreational use of public lands by non-resident visitors is rapidly increasing. Approximately 50% of the total expenditures by non-resident visitors in Alberta comes from the visitor whose purpose is pleasure. Although a large number of these visitors come to visit the National Parks, the capacity of the Parks to accommodate them in finite, and would appear to be reaching its limit. Alberta's other public lands will undoubtedly come under increasing pressure to provide recreational opportunities for the non-resident visitor. Is rampant exploration and indiscriminate establishment of strip mines in the foothill and mountain regions conducive to, or compatible with this other "industry"? We think that our Provincial Government should face up to the fact that tourists do not come to Alberta to recreate on seismic trails or coal exploration roads, or to view strip mines. It is the wilderness, or whatever remains of it that attracts most of our pleasure-seeking visitors. They can view indiscriminate industrial exploitation in their home Provinces or States, they don't need to journey to Alberta for that experience.

We recognize that most of these visitors do not utilize Alberta's wilderness directly (it could not of course withstand the pressure), yet they recreate in part of the "continuum" which ranges from the prairie to the foothills stream to mountain ridge and valley. Remove the "wilderness extreme" from the continuum and you remove, we think, a large part of the thrill and pleasure of expectation of every visitor who comes to Alberta for a "wildland" experience. Yet removal indeed will be the end result if we continue our present patterns of resource exploration and exploitation.

A number of factors point to "tourism" in Alberta increasing. The four-day work week, lowered airfares, increasing mobility of America's "working class". These will be urban "tourists" escaping to Alberta from the daily pressures of their man-made city environment to the natural environment of Alberta. Will our prairie, foothill, and mountain regions be able to provide the type of re-creational experience that they, and even our own urban residents need? No, not if resource exploitation continues its relentless march up every valley and over every ridge. We believe that a good case can be made for considering the recreation potential of our undeveloped wildlands as an economically viable alternative to resource development in much of our foothill and mountain areas. There is no excuse for ignoring this potential in making land-use policy decisions.

In conclusion, then, the Alberta Wilderness Association believes that the economic benefits and costs which accrue to Albertans as a result of coal exploration and strip mining operations should be carefully reviewed. If the long-term economic benefits of this form of resource exploitation do not clearly outweigh the costs, both social and economic, and if alternative non-destructive land uses will provide, in the balance, reasonable economic benefit with fewer real and social costs, then there is no justification for strip mining activities. One of the alternatives of land use which may be appropriate is the establishment of Wilderness Recreation Areas. Given a proper system of zoning for adjacent areas, the preservation and conservation of wilderness areas for recreational use will, in our opinion, often provide the greatest social and economic benefit over the longest period of time to the greatest number of Albertans. This potential benefit should not be sacrificed for the short term benefits which might possibly arise from any other resource development.

We believe that sound long term land-use policies must be forthcoming from the Provincial Legislature and that these policies should reflect the true needs, priorities, and wishes of the People of Alberta. We await presentation of these policies for public debate with anticipation.

The Alberta Wilderness Association

ALBERTA WILDERNESS ASSOCIATION

ADDENDUM TO BRIEF SUBMITTED TO THE PUBLIC HEARING ON THE ENVIRONMENTAL IMPACT OF STRIP MINING IN ALBERTA.

Held by: The Environment Conservation Authority

Place: Calgary, Alberta.

Date: December 21, 1971.

INTRODUCTION

At the Hearings on December 21, 1971, our written submission dealt primarily with the problem of land use and land use planning. The Association is concerned that one strip mine every 50 miles along the front range of the Rockies is an unwarranted excess. At the Hearing, we read into the record contents of letters we had just received, which were pertinent to reclamation procedures. We also commented verbally on various sections of the "PRINCIPLES UNDERLYING PROPOSED SURFACE RECLAMATION LEGISLATION". The Association now wishes to submit a formal statement on these items.

REASONS FOR THE FAILURE OF RECLAMATION IN THE EASTERN U.S.A.

"In general we have found that no method of surface mining for coal or of reclamation exists that in varying degrees does not cause stream pollution, landslides, accumulation of highly mineralized water, flooding, destruction of land for agricultural purposes, dislocation or disturbance of subsurface streams, destruction of aesthetic values, destruction of recreational areas and destruction of the full, natural range of future uses of the land.

"It is also our belief that if the external costs of these effects were fully transferred to the internal costs of the operator, there would be little or no stripping. Norman Williams, former deputy director of the West Virginia

Department of Natural Resources, more succinctly says: 'The profit of the strip mine operator is in direct proportion to the environmental costs he is allowed by the state to pass along to the community'.

"Nineteen of the twenty-three states where coal strip mining is practised have some form of regulation. In most of these states the regulations are a weak attempt to placate the public conscience through a series of loose regulations requiring some form of registration, moderate bonding, rounding the top of spoil banks, preventing unreasonable siltation and pollution, and replanting where practicable.

"There are two basic reasons why regulations do not work. One is lack of enforcement. The feeble regulatory efforts of states in the Appalachian coalfields are just no match for the immense political and economic power of the coal industry. Every one of the regulations mentioned above is routinely violated, with impunity. Nowhere is this more apparent than in the 27 counties of Eastern and Southeastern Ohio where strip mining has affected more than one-quarter of a million acres. Ohio's stripmine laws are an insult to man's intelligence.

"The second basic reason for the failure of regulation is that regulations generally prescribe procedures to be followed, rather than results to be achieved. Ultimately, no state holds the strip mine operator fully accountable for the condition of the land he leaves, nor requires him to meet any proper standard of reclamation. He is merely required to follow certain planning, grading and planting procedures; the success of which in returning the land to continuing productivity is not required.

"The lessons of the past suggest that the future role of the states should develop in terms of preventing strip mining, not in terms of regulating it." (1)

The Alberta Wilderness Association believes that we should try and avoid the pitfalls illustrated above, in the Bills the Government intends to bring before the Legislature.

COMMENTS ON "PRINCIPLES UNDERLYING PROPOSED SURFACE RECLAMATION LEGISLATION".

1. Section 2.2 - Emphasis on prevention of Environmental Damage.

This section does not seem to recognize that in some cases strip mining should not be allowed at all. We think that this is a grave error.

"Any legislation should, therefore, have as its basic intent

(a) the complete .... prohibition of strip mining in certain terrains or under certain environmentally or socially defined circumstances, and

(b) the strong regulation of all remaining surface mining.

"Complete .... prohibition of strip mining should apply to the following areas:

(1) "on slopes measuring more than 15 degrees from the horizontal between the undisturbed coal seam and the projected toe of the spoil bank;

(2) "anywhere it would result in deposition of spoil on a slope of greater than 15 degrees from the horizontal;

(3) "on federal or state (provincial) lands designated as (wilderness areas) natural areas, scenic river areas, parks, open space or other areas of unique or irreplaceable natural beauty, condition or utility;

(4) "anywhere restoration of the land to its former and natural utility, contour and best natural purpose is impractical or impossible;

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(1) From the "Statement" of Peter Borrelli, Eastern Conservation Representative, Sierra Club, Before Ohio State Senate Highway and Urban Affairs Committee, November 24, 1971.

(5) "anywhere it causes destruction of the future use of the area and surrounding areas, thereby destroying the health and property rights of others;

(6) "anywhere strip mining may cause stream pollution, landslides, accumulation of stagnant water, or flooding." (2)

2. Section 2.3 - Responsibility of Action on Resource User.

This is a great step forward. It is most important that the burden of proof be laid on the exploiter to prove that he will not do irreparable damage. However, we feel that there should also be a statement saying that the developer is responsible for the ultimate success of his reclamation. (See comemnts under Failure of Reclamation, above).

At one point, the 'PRINCIPLES' statement mentions that the "public is in the unfortunate position of proving the nature and extent of damages...". In so far as the Alberta Wilderness Association understands the laws of our Country, we as a "public", cannot bring a suit against anyone unless we can prove direct harm to ourselves as a "private organization". Only the Crown is allowed to protect the public interest. Unfortunately it is often remiss in this task. We believe that the concept of a "public trust" in law should be developed, so that the Court could be used if no satisfaction were to be obtained from the regulating agency. In this matter, the Courts could provide valuable relief in the form of a judicial moratorium. This forces further study and political argument. For a more complete discussion of the concept of "public trust" and the "right of the individual to sue", see footnote (3).

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(2) ibid., p.4.

(3) Sax, Joseph L. Defending the Environment, A Strategy for Citizen Action. Alfred A Knopf, New York, 1971, 252 pages. (Special Consumers Union Paperback $2.00).

3. Section 2.6 - Public Hearings on Environmental Matters.

We are encouraged to see the provision for public hearings. However, it is desirable to keep the place of public hearings in mind. They are one way in which public opinion can be expressed. The courts are another method. Public hearings "serve principally as forums to marshall and elucidate the available facts and to provide a focus for citizen organization, rather than as substitutes for conflict resolution of the sort carried out by the Courts". (4)

4. Section 3.0 - Conceptual Framework.

To the list of regulations, add one item, the ultimate success of reclamation undertaken.

5. Section 4.07 - Reclamation.

In the introduction to Government philosophy, we were asked to comment on the degree of regulation that individuals expect from the Legislation. The Alberta Wilderness Association expects very comprehensive regulation, and adequate enforcement of those regulations.

We hope that the period of disturbance would be as short as possible. However, we thought that more detail ought to have been included as to specific reclamation standards. We think the following items should be included in any Regulations on Reclamation.

SUGGESTED DETAILS OF RECLAMATION (5)

(i) Where the overburden is removed, it must be "stockpiled by strata, separately - topsoil and organic soil-forming material in one place and subsoil in another - in order that they may be replaced in proper order in the course of backfilling." (6)

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(4) Ibid. p.105.

(5) From the statement of H.E.L.P. (Help Eliminate Life Pollutants, Inc., 232 Wyoming Ave., Scranton, Pa 18503) made by Attorney Earnest D. Preate, to Public Hearings on the Pennsylvania ALL SURFACE MINING BILL, September 1971

(ii) "The overburden should be compacted to a minimum bearing load of 3,000 pounds per square foot after five years." (7)

(iii) "The surface should be graded and successfully planted with grass and trees to control water and prevent erosion." (5) The continuing success of the growth must be guaranteed.

(iv) "The reclamation plan must include a timetable. This timetable should be applied also to projected alternative uses as well as contouring and terracing. The bond should be withheld until the timetable has been met." (5)

(v) Stripmining should be prohibited in certain areas.

See comments in Section 2.2.

(vi) "When a permit to stripmine is issued, the operator must post a bond. We must keep in mind that this is a technique used to assure that the costs of reclaiming land mined from now on will not become public responsibility. The operator will get his Bond back if he follows the terms of his permit and reclamation plan. If he does not, the

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(6) Strip miners in Wales must reserve topsoil and "soil-making material" for minimum average depth of 9 inches from all land to be excavated, traversed with heavy machinery, or used for piling subsoil or overburden. Subsoil to a depth of 2 feet is also stacked separately. These are to be replaced on top of the over-burden in order, ensuring that within the depth of the subsoil there is no share or bind or other sterile material injurious to plant life.
Rhyd-Y-Blew Authorisation of 1970 under the Opencast Coal Act 1958, issued by Department of Trade and Industry, Office for Wales, Cardiff.

(7) Statement by Vicent Riggi, Registered Architect, and James Scandale, Registered Professional Engineer. Their firm Riggi & Riggi, Dunmore, Pa., is responsible for the plans for the Lackawanna County Vo-Tech School and the Carbondale Jr.-Sr. High School, both being built on reclaimed strip-mined land.

Bond must be high enough to cover the cost of carrying out the plan without him.

"There is a wide range in reclamation costs depending on soil and geology, amount and nature of overburden, depth of pits, and projected land use. It costs approximately \$5,700 per acre to reclaim land for the Vo-Tech School in Lackawanna County, (8) \$8,111 per acre in Norton, Virginia, and \$10,674 per acre for reclamation of some of the acres in Moraine State Park, Butler County, Pa. (9)." (5)

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(8) Ibid.

(9) Reported in Appalachia - Volume 4, No.5, p.20.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

In cost-benefit studies one always comes up with dollars for and dollars against and you are emphasizing the need to also look at benefits of a social nature. How would you propose that these be weighed as against those costs that can be quantified?

MR. GRANT MCNABB

One, the area deserves study. Secondly, this is often a political decision, in other words how much do the people appreciate and value the land that is about to be disturbed? This social cost is best made explicit in public hearings as you suggest in your prospectus. We also think another way to look at it is to make over-lays of potential resource uses and dollar incomes from various areas. Although we don't have any figures for tourist dollars, real or projected, to be spent in the foothills and plains versus the cost, we believe area strip mines would be affected from an esthetic point of view, a much larger area than the average two-and-a-half miles that is actually mined would be destroyed. How much it destroys for the purposes of recreation, and if we consider things on this basis, we might have a start at trying to get at the cost of these things.

DR. WALTER TROST

You made reference to the protection of watersheds. In the course of our hearings we have had strong statements made to us that indicate both that watersheds have been hurt in quantity and quality of flow and also that watersheds have not been hurt by the strip mining processes. Have you any evidence on one side or the other of this question?

MR. GRANT MCNABB

I have no evidence that I could bring before a court of law and say this did not live up to the standards of Alberta. We have not involved ourselves in this type of thing. We would view it as very desirable that, as a citizens group, we should have the right if we discover such circumstance that is not being properly regulated by the regulatory body, to hire a lawyer to build a case and bring the case against that particular company, but certainly we haven't involved ourselves in this as yet.

4.17

REPORT
by the
COMMITTEE ON THE RUNDLE MOUNTAIN STRIP MINE
appointed by the
Ratepayers of Harvie Heights and Bow Valley Subdivisions

September 1971

P.O. Box 451
Canmore, Alberta

September 29, 1971

Mr. Werner Selbstaedt
Box 661
Canmore, Alberta

Re: Rundle Mountain Strip Mine

Dear Mr. Selbstaedt:

At a meeting in Harvie Heights on September 3rd 1971 of the Ratepayers of Harvie Heights and Bow Valley Subdivisions the undersigned were elected as a Committee to meet with Canmore Mines Limited to determine their strip mining plans for coal on Rundle Mountain. The Committee met with Mr. W.J. Riva, Executive Vice President and Mr. H.G. Stephenson, Chief Engineer respectively of Canmore Mines Limited at 9:00 a.m. on September 11, 1971. The following is a report of this meeting with a summary.

The Committee was most impressed with the sincere and candid manner in which Mr. Riva and Mr. Stephenson discussed Canmore Mines Limited operations.

Respectfully submitted by members of the Committee

Neil V. Story
Jay Joffe Jay S. Joffe
Cec Elkins
Barney Jones
Harry Gray
David Miller

REPORT OF THE MEETING WITH CANMORE MINES LIMITED ON SEPTEMBER 11TH 1971 RE RUNDLE MOUNTAIN COAL STRIP MINE

Present for Canmore Mines Limited:

Mr. W.J. Riva	Executive Vice President
Mr. H.G. Stephenson	Chief Engineer

Present for the Ratepayers of Harvie Heights and Bow Valley Subdivisions:

Mr. N.V. Story
Mr. J. Joffe
Mr. C. Elkins
Mr. B. Jones
Mr. H. Gray
Mr. D. Miller

Summary:

1. Canmore Mines Limited, an affiliate of the Dillingham Corporation of U.S.A., states that it must produce in excess of 400,000 tons of coal per year to maintain its profitability or it must shut down its operation. It currently produces 250,000 tons of anthracite from its underground mines at Canmore and intends to augment this production and maintain profitability by strip mining coking coal from the area on Rundle Mountain presently cleared and known as Walker No. 1.

2. Canmore Mines has obtained a permit from the Department of Lands and Forests to strip coal from Walker No. 1 and produce an estimated 200,000 tons of coking coal under conditions contained in the attached letter from the Department of Lands and Forests. It has no permit to strip additional areas other than an "Approval in Principle" to strip mine the area.

3. Canmore Mines intends to.

(a) recover more or less than 200,000 tons of coking coal from Walker No. 1 dependent upon the economics of recovery

(b) cut access roads and cuts and carry out drilling programs on its lands on the south side of the Bow River between the Banff Park Boundary and Allen Mountain near Deadman's Flats.

(c) make application for permission to strip mine additional coking coal on its lands wherever drilling results indicate it is economical to strip mine.

4. Canmore Mines stated that the maximum area to be cleared on Walker No. 1 will be approximately 35 acres. The mine will open for an area of 300 to 400 feet wide by 1,000 feet long and to a depth of 120 feet. Rocks, gravel and top soil spoil heaps above and below the mine will be approximately 300 feet wide by 1,000 feet long by 50 feet high. The height of these spoil heaps has been determined by a "line of sight" from the Trans Canada Highway (not from Harvie Heights) so that the spoil heaps will hardly by visible from the highway.

5. A water filter system will be constructed so that water which enters the strip mine and becomes contaminated with coal and soil will be drained to pits 100 feet by 50 feet by 8 feet and allowed to filter through the gravel beds to offset recharge ponds which will filter the water into as many as 3 or more other offset recharge ponds until the water is clear.

6. Canmore Mines expects Walker No. 1, and other strip mines, to take 15 to 16 months for preparation and mining and 4 to 5 months for backfill and seeding or approximately 2 years from commencement to reclamation. Preparation of new strip mines and reclamation of mined areas will be carried out

so that the actual strip mining operation can be carried out continuously. Canmore Mines estimates that all the strip mining on Rundle Mountain and on Three Sisters' Mountain to Allen Mountain can be completed within 10 years.

7. Canmore Mines expects to employ about 28 men on strip mining some of which may not be local people. It states that it employs a total of 300, and 200 more in Canmore are dependent upon the total mining operation and possibly a further 1,000 Canadians are employed as a result of Canmore Mines operation in Canada. Canmore Mines says that its payroll is between \$2½ to 3 million per year.

8. Canmore Mines has stated its sincerity and intent in complying with Government operational and reclamation requirements up to and possibly in excess of its legal obligation.

9. Canmore Mines is having a Land Development Study carried out by a Calgary consultant and, if feasible, it could be interested in developing the sites of strip mines for housing and/or recreational use.

10. Inspection of stripped and mined areas showed that reclamation to "green" areas was being accomplished by Canmore Mines.

NOTES ON MEETING WITH
CANMORE MINES ON SEPTEMBER 11, 1971

By way of introduction, Mr. Riva presented a brief outline of the history of the company and indicated the extent of the company's property. Some noteworthy points made by Mr. Riva were as follows:

1. The opportunity for Canadianization of the company was presented when the mine came up for sale, but no Canadian firms it is reported indicated any interest.

2. The company owns approximately 6,000 acres of land title-free extending from Canmore through to Mount Allen bordering on the Kannanaskis Valley, all on the south side of the #1 highway, and has mineral rights on about another 6,000 acres.

3. The mine employs about 300 out of the roughly 400 working people in Canmore.

   Mr. Stephenson then gave a description of the stripping operations on Rundle, the reclamation work intended and an outline of the procedures required in obtaining government approval. The following points regarding the strip mine were brought to light during Mr. Stephenson's explanation, and from questions directed to both gentlemen by the Committee:

   (a) The strip mine, while it is in operation, is intended to contribute about 1/3 of the total coal production of Canmore Mines. This coal is \$2 to \$4 per ton cheaper to produce than underground mined coal. While \$2 to \$4 per ton may not seem significant it represents 25 to 50% of the pithead value of the coal which is very significant to Canmore Mines. Mr. Riva said that it was "demonstrable" that the strip mine was essential in that the overall price of coal was reduced to where it became competitive and the company was thus able to stay in operation.

(b) The strip mine is producing coking coal which is being sold to Japan for use in their steel industry. Other coal in the area mined by underground methods is anthracite, unsuitable for coking.

(c) The present strip mine is on crown land, the former site of Georgetown from which mineral rights were leased in 1910.

(d) While the company has had the mineral rights since 1910, permission had to be obtained both for prospecting the area and for the operation of the strip mine. Application for prospecting was sent in January 1971, and approval came six weeks later. Following prospecting a rough proposal of the stripping operation had to be sent to the provincial government to obtain an approval in principle for the mine. Approval in principle being granted, the company was then obliged to submit a detailed proposal for the strip to obtain final approval. The mining was to be carried out in accordance with a set of regulations established by the Department of the Environment & Lands & Forests and attached. The Committee did not see these regulations at the time but were assured that they were quite comprehensive, covering such things as appearance and visibility, prevention of siltation of river by surface run-off from the mine, restoration and reseeding, construction of access roads and prevention of erosion etc.

(e) The Committee were shown schematic cross sections of the strip and it was explained how efforts had been made to minimize its visableness from the highway, and it was told that if further stripping were to be carried out, even more effort would be made in this direction, although it was also stated that it could not be promised that further mining would be less visable, since terrain configuration might not make this possible.

(f) The Committee were also shown a schematic of the water filtering pond system whereby surface water in the mine pit is to be pumped into the ponds and allowed to seep into the ground, being filtered by the gravel layers in the ground as it moves downslope to the river. The downhill side of the ponds are built up with a mixture of 60% pebbles and 40% clay. The permeability of this combination was questioned. Also questioned was the problem of preventing mine acids (formed from pyritic sulphur associated with coal production) from entering the water and forming a source of pollution. Mr. Riva stated that problems with mine acids were not common to this area, and passed around an artical written by himself which quoted figures stating that "unlike eastern and most European coals, which commonly contain 2% or more of pyritic sulphur, and which therefore often create serious problems through acid mine waters, Western Canadian coals carry no more than about 0.2 to 0.3% pyritic sulphur. The remainder.....is organically bound to carbon and not amenable to atmospheric conversions into SO2 & SO3 (which can form acids). It was pointed out that this was generally true except for isolated instances (i.e. Coleman Creek in the Crowsnest).

(g) In the stripping operation the Committee were told, the top soil was first removed and placed back in the trees in a protected location. The overburden was then removed and placed along the edges of the pit to form "spoil heaps" the top of the heap was not allowed to go above tree level to make the site less noticable. Restoration after mining called for replacing the overburden, leveling and adding the topsoil along with peat moss. Then reseeding using a special spraying machine filled with seed and "mulch." It was not necessarily intended to replant trees. It was thought by Mr. Riva and Mr. Stephenson that an open green area on the mountain would not be unattractive. An important point made here was that from a conservational point of view an open grassy area would provide a valuable grazing area for wild animals lacking in the mature, densely forested area of the north side of Rundle. The possibility of forming lakes for fishing and recreational purposes was also discussed. This was considered a very attractive scheme but would depend on government approval, and the government for the present, seemed to favour conventional restoration. It was further explained that in clearing the land, roots and branches were burned on site, the marketable timber was disposed 60% to Canmore Mines, 30% sold to sawmills and the rest given gratis to provincial campgrounds for fire wood.

(h) The total land in the area which can be economically strip mined is not known. The present strip mine on Rundle occupies an area somewhat over 35 acres and will be 120 feet deep. It is expected to produce 200,000 tons of coal.

If further coal bearing land is found suitable for stripping, the company would have to go through the same procedure with the provincial government to obtain a permit. The present mine will be depleted in 15 to 16 months. It will take another 4 to 5 months to carry out restoration activities and a full growing season to produce the desired effect. During restoration, if prospecting yields additional suitable land another strip may be started. Exploration is presently underway in the area adjacent to the present strip mine towards the Park boundry and back towards Canmore. However, the amount of land laid open for mining will not increase much beyond the present size at any one time.

(i) It was stated that stripping operations will be completed and are unlikely to occur ten years hence. All strippable areas will be exhausted in the Canmore corridor and elsewhere by then. Underground mining will then be the only form and it will be necessary for the company to develop competitive methods of underground mining before that time arrives.

(j) About 28 men will be employed on the strip mine. During clearing operations some of the men employed were not locals. At least 50% of the clearing crews were made up of local students attending university or technical school.

Monies disbursed by Canmore Mines are as follows:

- Royalties on coal to the Provincial Government - 10¢ per ton or $20,000 for the strip mine
- $2½ to 3 million from mine payroll to Canmore miners
- $500,000 to $750,000 per year on material bought locally (mostly)
- lease and rental payments 6 to $10,000 per year

Canmore Mines profits are taxed at 50% of which the provincial government receives one fifth.

The cost of maintaining its leases has already resulted in payments of $75,000 to the Provincial government.

(k) It was disclosed that there is probably enough coal in the valley to make the mine (underground) last about 50 years.

(1) Dillingham's are having a land-use survey made of the Canmore area which may be ready next year. Particular emphasis is being placed on the possibility of development of the area for tourism and recreation. They apparently recognize the potential of this area for that type of activity. What might be offered in this regard was not stated at the meeting but would depend on the recommendations of the survey.

Following the discussion members of the group were given a tour of the strip mine site as well as three smaller exhausted strips two of which were in the process of being reclaimed. Observations were as follows:

(a) The access road into the site seemed a better grade construction than older roads in the area. The top surface was of packed shale mixed with some coal and was smoother than the average gravel road. An effort had been made to clear debris, and dead timber from the roadside and to grade the road so as to prevent erosion.

(b) The mine site itself was not too pleasent to behold, as might be expected. Overburden was removed and a coal seam exposed. The Committee were shown where the topsoil was being stored but did not visit that spot. The land on which the site was located in direct contrast to the strip is magnificent - located high above the Bow Valley (700 feet est.) far from highway noise, with a tremendous panorama of the mountains on the north side (Harvie Heights) and an inspiring view of the crags of Rundle looming up from the back. Of the three other smaller stripping operations the Committee saw, one was still open, another had just been seeded, and the third had been seeded some weeks earlier.

The two reclaimed mines had been smoothly contoured - the ground generally forming a depression on where it had been mined. This, we were told would be suitable for making a lake once surface vegétation had been established. The one area that had been reseeded a few weeks earlier was already showing a sparse covering of vegetation - seeded grass and indigenous growth. It was explained that some of the area had experimentally not been seeded to see how local growth would spread in. It was also explained that the top soil had unfortunately not been kept separate from overburden during stripping so growth was not as thick as it could be.

GENERAL COMMENTS

COMMITTEE

1. There is no question that the public relations aspect has been almost completely ignored with respect to both the Harvie Heights area residents and, in fact, Alberta and the rest of Canada.

The men from the mine have a job to do and are doing it to the best of their ability. The fact that serious mistakes can be made is evident by their own admission that the present mine could have been made less of an eyesore by leaving a strip of trees to hide the spoil heaps. The government has done a disastrous job of planning and public relations in that even now after commencement of the operations, no one seems to know what the plans are for the area after it is reclaimed - and this is on crown land.

2. It is a great pity that Canmore Mines and the Provincial Government did not consider that the "line of sight" for the determination of the height of spoil heaps and the general design of the strip operation could better have been from the top of Harvie Heights than from the Trans Canada highway. Canmore Mines stated that the effect of this would not affect their operation.

3. If Canmore Mines needs 400,000 tons of coal sales per year to stay in business and cannot increase its sales of anthracite it will have to strip mine 150,000 tons of coking coal per year to maintain profitability and to avoid closing down. This means a strip mine per year the size of Walker No. 1 which could be located anywhere or all the way from the Park Boundary to Allen Mountain!!

CANMORE MINES

1. Canmore Mines has been the major contributor to recreational facilities in this area. The skating and curling rinks were both built by the Company and still benefit through free power and major maintenance. The tennis courts were constructed through the use of Canmore Mine construction equipment and gravel from its property. The surface was laid by the Department of Highways. The Canmore golf course has also benefited substantially from the use of the company's machinery. All of these facilities are available to the public and residents throughout the valley.

2. It is quite unfair to say that no one seems to know what the plans are for the area after it is reclaimed. There are no specific plans of development for most of the valley, but specifically the land is to be reclaimed by

backfilling and a programme of revegetation. There may be some change in the programme if a development scheme is conceived and authorized - otherwise it will be as specified in our agreement with the Department of Lands and Forests.

3. I believe we said that we would like to mine 500,000 tons or more in total and in fact hope eventually to reach 1,000,000 tons per year. Of this total we would not expect to get more than 150,000 tons per year of coking coal from a surface mine at Georgetown unless the purpose was to wind up that part of the operation quickly. We might also point out that progressive reclamation means that Walker No. 1 as it stands represents the maximum disturbance which will be created at any one time and that after 85 years of mining in the valley, none of our previous operations - surface or underground, have left permanent, visible scars.

EXTRACT FROM A LETTER FROM THE MINISTER, DEPARTMENT OF LANDS & FORESTS - DATED AUGUST 13, 1971

".....relative to the operation of Canmore Mines Limited at the base of Rundle Mountain. In this general area the company acquired title to coal rights and surface rights on several sections prior to the turn of the century. Some of the coal leases were acquired around 1909. These sales and leases were acquired from the Federal Government prior to 1930 when the resources were transferred to the province for administration.

The proposed strip mining that would involve Crown surface was examined in great detail before approval was granted by the Government. The Government approved the company's plans after we made sure that very little of the operation could be viewed from the highway or from the Harvie Heights Subdivision and that the operation and reclamation would be carried out in such a way that erosion or siltation of any streams would not occur.

The location of the Canmore strip mine is not in an area designated as a natural or wilderness area. It is in an area where the prevailing winds are such that the operation would not affect the National Park or residents at Harvie Heights.

The area on which the strip mine is located has, in general, a stand of over mature timber.

Insofar as the revenue is concerned, the royalty is only one portion of the benefits which accrue to the province. In addition to the employment which this coal mining operation generates there is also the matter of revenue from the timber which was on the land. The company salvaged all the merchantable timber. The non-merchantable timber was cut into suitable lengths and was made available for public campsite purposes without charge.

Periodic inspections are being made and will continue to be made to ensure that the mining company is complying with the conditions imposed by the Government.

The following is a list of stipulations under which the company was granted authority to mine this area:

1. Drainage ditch or ditches required to prevent the water from entering the disturbed areas shall be in such a location and of such design as may be authorized by the Director of Water Resources.

2. The surface fill shall be placed in a pile separate from the balance of the spoil and shall be replaced as the topmost layer for reclamation purposes.

3. The final contoured slopes shall not exceed the natural slopes in the area being disturbed and in no case shall the surface slope exceed 20°.

4. As soon as permission is granted by the Director of Mines, the pits shall be backfilled.

5. Reclamation, which includes revegetation of the area, shall commence as soon as weather conditions permit.

6. Temporary access roads shall not have a crown exceeding 18 feet in width and the permanent access road shall not have a crown exceeding 25 feet in width. Clearing shall not exceed 40 and 66 feet respectively.

7. Temporary spoil piles shall not be permitted in a location which would result in siltation of any drainage course.

8. The slopes and location of the spoil material must be such that no failures will occur in either the foundation upon which the spoil material has been placed or the spoil material itself.

9. No permanent spoil piles will be permitted.

10. Sedimentation ponds may be required and it may be necessary to have the sedimentation ponds operative until revegetation has been totally accomplished.

11. That the company submit a reclamation deposit of $500.00 per acre (which is $23,500.00) in cash, or bearer bonds with a cash surrender value of $23,500.00, to cover the 1971 mining operation as approved.

12. That the company complete progressive backfilling and reclamation.

There will be no permanent scars when mining operations are completed and the area has been revegetated by the company."

HARVIE HEIGHTS & BOW VALLEY SUBDIVISIONS RATEPAYERS
STRIP MINE COMMITTEE RECOMMENDATIONS

As a result of recent investigation of the Strip Mining on Rundle Mountain the following recommendations are made:

It is recommended that the Ratepayers of the Harvie Heights and Bow Valley Subdivisions ("the Ratepayers"):

(1) Submit a written request to The Environment Conservation Authority, (9912 - 107th Street, Edmonton, Attention: Dr Trost) and/or other Alberta Government Department having Jurisdiction thereto, asking that a Public Hearing be held to hear Canmore Mines Limited application to carry out any further strip mining on Rundle Mountain than that presently underway. The purpose of this Hearing is to allow the Ratepayers and any other interested Canadian to:

(a) Hear Canmore Mines Limited plans for the stripping of Rundle Mountain

(b) Question the social and economic reasons why Canmore Mines feel it is necessary to strip Rundle Mountain

(c) Enable the opinions of the Ratepayers, interested Canadians and interested groups of Canadians to be heard and registered.

(d) Hear the Alberta Government's reasons, decisions and requirements for allowing or curtailing further strip mining on Rundle Mountain.

(2) Submit a written request to Canmore Mines with copies to Ministers of The Departments of Environment, Lands & Forests, Mines and Minerals and to the Chairman of The Environment Conservation Authority that any further stripping and development of strip mining on Rundle Mountain be carried out to conceal as much of the stripping spoil heaps etc. using a "Line of Sight" from the top road in Harvie Heights and not from the Trans Canada Highway.

(3) Submit a written request to its M.L.A., Mr. Copithorne and the Alberta Government requesting that it be kept informed of

(a) any further developments in the strip mining of Rundle Mountain from that presently underway.

...../2

(b) any other developments, or applications for development to the Alberta Government, pertaining to the subdivision of Harvie Heights and Bow Valley which might affect the taxes, environment and ecology of the subdivisions or the life of the Ratepayers.

The purpose of this request is to enable information with regard to any development or proposed development in the subdivisions to be made available to the Ratepayers in sufficient time so that the comments and opinion of the Ratepayers can be received by the Alberta Government before the decision is made to accept or reject any development in the subdivisions.

(4) Submit a written request to Canmore Mines asking that the Ratepayers be kept informed of the plans for the development of Strip Mining on Rundle Mountain.

(5) Maintain a committee of four to six persons to investigate and report to the Ratepayers on the strip mine and any other development which is likely to affect the Ratepayers.

(6) Acknowledge the courtesy and time given to the Strip Mine Committee by Canmore Mines with a letter of thanks to Messrs. Riva and Stephenson.

October 21, 1971

4.18

SUBMISSION BY NEIL V. STORY

P. O. BOX 451, CANMORE, ALBERTA

Chairman
Environmental Conservation Authority
9912 - 107 Street
Edmonton, Alberta

Mr. Chairman:

Re: Environmental Impact of Strip Mining Operations in Alberta - Rundle Mountain Strip Mine

My name is Neil V. Story, I am a resident of Harvie Heights near Canmore, which is located on the north slope of the Bow Valley directly opposite the coal strip mine on Rundle Mountain. This submission refers only to the strip mine on Rundle Mountain.

I, herewith submit a copy of a report by the Committee on Rundle Mountain Strip Mine appointed by the Ratepayers of Harvie Heights and the Bow Valley subdivision. This report consists of:

a. a summary of a meeting with Canmore Mines Ltd. reporting its reasons and plans for strip mining not only on Rundle Mountain, but on its lands and Crown lands in the Canmore Corridor.

b. minutes of a meeting with Canmore Mines Ltd. and an inspection of the Walker #1 strip mine.

c. comments by the committee regarding the above and Canmore Mines Ltd.

d. an extract from a letter from the Minister of Lands and Forests reporting Alberta Government conditions permitting strip mining on Rundle Mountain.

e. copy of a letter from Canmore Mines Ltd. reporting its comments to items (a) to (e) above.

f. recommendations by the Strip Mine Committee regarding the above.

The following is my submission made as a Canadian and as a resident of Harvie Heights and based on the above fact finding report:

1. Canmore Mines Ltd., an affiliate of the Dillingham Corporation of the U.S.A. states that it must produce in excess of 400,000 tons of coal (anthractite and coking) per year to maintain its profitability or it must shut down its operation. (which in effect would "shut down" Canmore.) It currently produces 250,000tons of anthracite from its underground mines at Canmore and can make up the balance required for profitability by strip mine coking coal from its lands in the Canmore Corridor. The current Walker No. 1 strip mine will last approximately 16 months from preparation through mining to reclamation, therefore,

in order to maintain profitability, one strip mine per year the size of Walker No. 1 presumably will be required in the Canmore Corridor between the Banff Park east gates to east of Pigeon Mountain. No one wants to see Canmore shut down, but I respectfully urge this Authority to determine the following:

a. Is it necessary to sacrifice Rundle Mountain and the south side of the Canmore Corridor to save Canmore?

b. Are the economics of strip mining in the Canmore Corridor, as stated by Dillingham, accurate and factual?

c. Will Canmore be shut down if strip mining in view of the public in the Canmore Corridor is stopped?

d. Would not a tax subsidy or similar be more appropriate than stripping the Canmore Corridor should Canmore be faced with shut down?

e. Is the quality and quantity of coking coal actually being mined sufficient to make the total Canmore Mines Ltd. operation profitable?

f. What will happen to the Canmore Mines Ltd. profitability if the royalty on coal is raised by the Alberta Government, as is expected?

g. I believe there is coal all through this area, is there not some other adjacent coal bearing area hidden from the general view which might be exchanged for Canmore Mines coal bearing lands on Rundle Mountain and in the Canmore Corridor?

2. I appreciate very much being allowed to make a submission reporting strip mining in Alberta at this time, but I would have preferred to have had my comments heard before the stripping of Rundle Mountain commenced. It is hereby requested that all such strip mining development planned for Alberta which could affect the environment, ecology and/or the way of life and property value of Albertans and nearby residents be publicly heard so that Albertans, local residents and other Canadians and affected persons might have the opportunity to be heard before such developments are authorized to proceed.

3. Should any extension of the current strip mining take place on Rundle Mountain it is requested that the stripping be designed to hide it as much as possible not only from the Trans Canada Highway, but also from

Harvie Heights and that the "Line of Sight", which determines the height of the spoil heaps, etc. be taken from the top road of Harvie Heights and not from the Trans Canada Highway, which was the case in the design of the present Walker No. 1 strip mine.

Respectfully submitted,

Neil V. Story

NVS/vg

December 15, 1971

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

In your brief you ask a series of questions. Has your committee itself a view as to what the answers to some of the questions that you have put might be?

MR. NEIL V. STOREY

The committee was unanimous in its recommendations which are attached. We as members of Harvie Heights and the Bow Valley Sub-division, feel that we are neighbors of Canmore and the people of Canmore are friends whose livelihood is based on the profitability of Canmore Mines, the strip mine operation. There is no doubt whatsoever in my mind or any of the committee's minds that the principals of Canmore Mines, Mr. Riva and Mr. Stephenson are most sincere and dedicated persons. We feel the work that they have been doing on relatively small strip mines has been most commendable. We are concerned however that this possibly isn't the answer. We visualize the six or seven miles of the Canmore corridor down one side being turned into either one strip mine after another, or one large one. Size, and size of equipment is the trend with regards to better economics. We can see that this might happen and we are concerned. We move to that area, we live in that area because we like the mountains and the environment. We know that the Walker No. 1 will be reclaimed as has been promised and shown, we are concerned about the time it will take to reclaim and the timing of everything else. Our opinion, I suppose at Harvie Heights and others, is divided but we don't want to see strip mining continue. We don't want to see people out of work. I feel, particularly, that it may be that the cost of stripping this valley to keep the operation going another few years is just not warranted or it may not be warranted. There may be other things that could be done that will keep Canmore Mines going and keep it going profitably.

DR. WALTER TROST

You are attempting to protect the livelihood of Canmore town and its residents, and at the same time attempting to protect the environmental integrity of the valley itself?

MR. NEIL V. STOREY

That is correct. That is my personal position.

DR. WALTER TROST

In your own judgement can the welfare of the town and the welfare of the valley be satisfied?

MR. NEIL V. STOREY

I don't know the answer to that. I feel that in a relatively small-sized mine that is being operated with a high quality of initial reclamation that one strip mine might be reclaimed satisfactorily so that it would fit in with the profitability of the mine and also with the local residents. After all I suppose the damage has now been done. Reclamation will return grass and some shrubs, some wild flowers for the area, but it won't put any trees back. This may be acceptable to residents in the Canmore corridor with one mine, but what happens next? Is this whole valley going to be stripped? It would seem to me that it would. It would seem to me that, and Mr. Stephenson can answer this a lot better than I can, attempts have been made to increase production of anthracite in world markets and failed. There is a lot of competition from mines that are working with ultra modern equipment and government subsidies. These are the people Canmore mines are competing with. Whether this market can be developed to compete and so maintain the profitability of Canmore without strip mines I don't know. It would seem to me that what we are looking at is that if sales of anthracite can't be increased then the intent would be to strip that valley and strip from one end to the other because, as far as I understand, there is coal all the way along. I believe that Canmore corridor will be developed as a people area, accommodation will be required and I believe that possibly the present strip mine might serve this purpose, to benefit, but when I multiply that by six miles or the length of the corridor, it is just more than I know the answer to. it is just more than I can visualize, ruining that valley.

DR. STUART SMITH

I wonder if you would care to state whether or not under Mr. Stephenson's management has there been as much done with the area as humanly possible and do you find this encouraging? The reason I ask this, there was some contention between other speakers as to what had or had not been done. You live in the area and you have seen the open pits and you have seen the attempts at reclamation. Would you care to make a statement on what the management there has done in reclamation and the efforts they go to to accomplish that?

MR. NEIL V. STOREY

My experience with Canmore Mines has been in the last three to six months. I have been most impressed with my meetings with Mr. Riva and Mr. Stephenson and so has everybody else. There is no doubt that they are very fine people, very respected people in Canmore. We have inspected the reclaimed area which presumably was stripped and is now reclaimed, we have seen the plans and gone over in detail what is intended for Walker No. 1 and I would say that everybody was most satisfied. But there is another part of the mine, and this part I don't know. This is the old mine. As we go down the highway there are coal dumps on the side of the highway, there are coal dumps on the side of the river which can be seen. This is a hangover from the underground mine, it's part of that operation. This I am not qualified to speak about.

DR. STUART SMITH

Which would you find most desirable, to have open, grassed areas with timber, or houses, on the land that Canmore Mines controls?

MR. NEIL V. STOREY

From a personal point of view I would much rather see it the way it was with the trees all the way along. From a practical point of view it is quite obvious that the increasing population is going to demand accommodation and facilities and these can only take place in the park area or outside the park area. The obvious place for them to be located is in the Canmore corridor. This is something that I am not particularly happy about but nevertheless it is a fact of life, but I don't think that the Canmore corridor should become an industrial area for this reason. I think it's a people area, it must be.

4.19 STRIP MINING IN THE MOUNTAINS.

A brief submitted to the
Environment Conservation Authority
by the Bow Valley Naturalists Club.

Presented by Michael McIvor

By: Michael D. McIvor
Box 114, Banff, Alta.

December 21, 1971

Strip Mining in the Mountains.

I am submitting this brief, on the subject of strip mining in the mountains, on behalf of the Bow Valley Naturalists Club. We are an organization of approximately one hundred members, from Banff, Lake Louise, Canmore, Exshaw and Seebe. We are one of the founding groups of the Federation of Alberta Naturalists. We feel our residence in the mountains gives us a special reason for participating in these proceedings. We applaud the decision of the Environment Conservation Authority to conduct these hearings, and wish them well in their future endeavors.

There are two aspects to the subject of strip mining in the mountains, and its effect on the environment. Firstly, if we accept the inevitability of development of our natural resources, then we must accept the fact that environmental damage will occur. We must attempt to minimize this damage and quickly restore the orginal or higher values of the land. Secondly, we must be aware, that, because of the nature of the strip mining process, some areas proposed for development could be harmed beyond recovery, and therefore must be protected.

The mountains pose special problems for strip mining. They are the source of tangible economic benefits such as water resources and recreation. They meet the intangible social needs for beauty and re-creation. Mountain regions are subject to vagaries of terrain and climate which make restoration of damaged areas very difficult. Strip mining can not only change the environmental shape of the mountains, it can impede continued productivity and discourage the development of other types of land use.

Let us not be deceived into thinking that strip mining involves only very small areas. Beyond the stripped region itself, the miles of frequently unnecessary and over developed road systems must be considered. There are the areas upon which the overburden is dumped, and of course, the ever present dust. There is potential for water pollution directly through erosion and siltation, or the improper disposal of mine wastes, and indirectly through the effects of blasting.

The folding process which helped build the Rocky Mountains, improved the quality of coal by compressing it, but has also made it friable, resulting in dust as a significant problem in strip mining. There should be a study made of the effects of coal dust pollution on snow melt tendencies. Premature melting of snow could result in the loss of protective cover for vegetation. Also, the regular delivery of water in the spring could be affected.

Studies concerning coal, by the Geological Survey of Canada, indicate the vast reserves of this particular natural resource. Thus, we cannot accept a plea of scarcity, as a justification for the hurried, ill-considered plundering of our mountain areas. Nor does the present need for coal overshadow the supply. Therefore it would be erroneous to assume that not developing our coal resources in the mountains, immediately, would inflict any great hardship on the provincial economy. In fact, the provincial economy would probably be strengthened in many cases, by altogether different land uses of these areas. Furthermore, strip mines provide relatively little employment. As the size of machinery grows, this work force will dwindle. Most of the skills employed by workers in strip mines could be utilized in other developments such as road building and urban renewal.

It is apparent that strip mining often is, and will be, taking place, where, except for economic reasons, underground mining would also be possible. For example, the United States Geological Survey estimates of strippable coal, include reserves as much as one hundred feet, and in some cases one hundred and fifty feet beneath the surface. This trend is likely to continue, especially as the size of machinery continues to grow. Perhaps stringent controls on the operation of strip mines would encourage a return to underground mining, which, if carefully controlled, would have less severe effects on the environment. Thus,while raising the cost of mining coal to certain operators, the social cost of an impaired environment would be lowered.

Although we are a natural history organization, we feel compelled to submit a plea for the very cautious selling of our natural resources to foreign markets. There are very real dangers inherent in a wholescale sale of our natural resources for short term gains, but at the cost of a defaced landscape, and the provision of only minimal employment.

The role of coal as an energy source in the generation of electrical power, is doomed to obsolescence, because of the nature of coal as a non-renewable resource. It would be unfortunate, if we continued to strip our land of coal to solve a predicted energy crisis, at a time when investment and research should be developing cleaner, more efficient means for the production of energy.

A neglected area of concern in the economic life of the province, is the study of economic benefits accruing from a recreational use of land. The mountains are a source of prime recreational potential and an attempt to put a dollars and cents value on the burgeoning reality of recreation and tourism, could allow this use of the mountains, to compete, for land requirements, on an equal basis, with mineral production. Unfortunately, in the past, recreation has not been encouraged in the Rocky Mountain Forest Reserve, where much strip mining has, and may occur. The fact that the Right of Entry Arbitration Act did not exempt the Forest Reserves, is an indication of the hierarchy of resource uses in the past.

The value of recreation in the mountains can not be stressed enough. This value must not be dismissed as aesthetic and cultural intangibles. It can, and must be reckoned in economic terms. And this potential value must consider such trends as the growth of urban populations, hungering for outdoor or even wilderness experiences; the increase in the amount of leisure time to be enjoyed by the citizens of the future; and the rising level of affluence. Similarly, the environmental damage caused by strip mining, and the cost of repairing it, must not be weighted on today's scale, but on a scale of the future, when, particularly because of the size of machinery, the potential for damage will

will be much greater.

One basic reason for the tendancy of the provincial government, in the past, to overlook the potential recreational value of the mountain areas, has been the heavy reliance of the government on the National Parks, to provide for the recreational needs of the province, and the tourist industry which it encourages. But, if National Parks are to remain unimpaired for future generations, then more and more we must look to the mountain regions outside of the Parks, to meet recreational demands. Artificial types of recreation, and resort developments involving concentrations of large numbers of people, which should not occur in National Parks, could be permitted, and even encouraged in these areas. They could absorb the sort of activities which would not be commensurated with the degree of protection that should be afforded in a National Park.

This raises the subject of buffer zones. Pressures on the Mountain National Parks in Alberta, will be stern enough, in the years ahead, without allowing resource extraction to take place right to the very boundaries of the Parks. Ecosystems, and more specifically wildlife, do not reconize the artificial boundaries imposed by man. The Provincial Government should formulate a system of buffer zones, where resource extraction is forbidden, on the boundaries of all National Parks found in Alberta.

It is generally realized that the numbers of our wildlife are declining and references are made to the Rocky Mountains as a last refuge of many, particularly big-game animals. The largest, single contributing factor to this decline is not over-hunting, and not pollution of various kinds, but the destruction of wildlife habitat. Allowing strip mining in areas which are key grazing ranges in summer, or allowing the proliferation of mining roads in key, valley bottom, winter ranges, will hasten the destruction of habitat and further diminish wildlife populations. Extra hunting pressures will also be applied on game species as formerly remote areas become more readily accessible through travel on strip mine related roads. Studies should be made prior to the issuing of permits for exploration or development, to ensure that vital wildlife ranges will not be disturbed.

Perhaps the most important of the tangible benefits of the mountain areas are their function as a watershed, storing and releasing water in quantity and with regularity that ensures the productivity of the prairie region. Presumably this was one of the major reasons for the creation of the Forest Reserves. Stripping of soil and the vegetative cover which provide the vital storage facilities for much of this water, can disrupt the normal system of regular distribution. Only time will tell the effects of strip mines on the tributaries of almost every major prairie river.

Erosion and eventual silation can also effect the quality of the water resource. Specific environmental impact studies could determine whether or not the stripping of particular areas would be detrimental to watershed values in that region. On these terms, strip mining would have to be banned in some parts of the mountains, and in areas where it is permitted, restoration would have to be prompt.

One reclamation plan studied, included the digging of peat from swampy areas, to mix with and compensate for, the thin layer of topsoil. Such a step should not be taken without study. The peat bogs and swamps of the mountains are subtle, natural means of conserving water.

Further problems involving water resources may be encountered with effects of strip mining on subsurface hydrology. These effects, particulary as a result of the blasting, which is an integral part of most strip mining operations, can decrease the quantity and quality of the water resource. Blasting, by opening fissures in the subsurface structures may allow water to flow to the surface, thus lowering the water table. Or, it may allow the penetration into the underground water of acids and other pollutants. The cost of a depleted, polluted or otherwise impaired water resource must be considered in judging the long term benefits of strip mining.

Steepness of pitch or slope must be a limiting factor in locating strip mines. Soil erosion and its companion problems of sliding and slumping can become excessive on steep slopes.

In the higher reaches of the mountains, above timberline, is found the alpine tundra [illegible] life zone. These are areas combining the highest aesthetic values, with fragile, delicate ecosystems. The soil mantle is extremely thin and vegetation is slow growing. Climatic conditions are harsh. Under these circumstances, reclamation even of the most extensive kind, is a virtual impossiblity, Excessive soil erosion could simply not be avoided, and soil here is in short supply. The likelihood of successful reseeding above the six thousand foot level, is very remote. Restoration after mountain top stripping would be a very loosely defined process. It is absolutely impossible to recreate alpine peaks and ridges. Any strip mining above timberline would result in drastic and possibly irreparable damage to the natural and aesthetic conditions of these regions. Exploration and development too close to timberline could also result in over use of the alpine areas by the public, because of too ready access. For these reasons, there should be an immediate and total ban on all strip mining above the six thousand foot level, and all surface exploration activities above this contour should now cease.

If it is felt that strip mining could be allowed in certain parts of the mountains, involving an acceptable minimum of environmental damage, then strict regulations must be installed. Society is no longer willing to bear the long term costs of operations, the benefits of which are short term and limited in scope. The external costs of landscape blight must no longer be passed on to the public. They must be internalized as part of a company's operating budget.

There must be regulations governing the actual process of exploration, development, and abandonment. Reclamation plans for these aspects of strip mining must be submitted and approved, prior to the issuing of permits. Future legislation should consider the principle of accountability and provide for legislative or public hearings in advance of developments proposed for sensitive areas. Also, there should be allowance in future legislation for individual citizens or groups to initiate legal proceedings against companies or governments causing environmental damage. Definitely, there should be a retroactive feature in the new legislation. It would require the cleaning up and reclamation of areas stripped at any time in the past, by operators now in business. It would require operators moving into areas formerly stripped and abandoned by other companies, to attend to reclamation matters before proceeding with any new stripping. The government must also attend to the backlog of abandoned areas, for which there are no accountable parties. This may be a costly undertaking, and it is inevitable that the public will have to pay the price.

Reclamation procedures in the mountain areas to date, have involved the reseeding of graded slopes. However, there has been little effort, or even study made, with regard to revegetation with native grass or plants. Instead, reseeding has seen the artificial mixture of various types of domestic seed, in an attempt to find a blend that will survive the rigorous mountain conditions, beyond the first few years. These steps should be considered only as a stop gap measure, designed to retard erosion. There must be a return of the plant life which evolution has determined is best adapted to the mountain terrain and climate. Ecological stability is directly dependent upon the diversity of the elements within ecosystems.

proper reclamation should ensure the return of this diversity. Furthermore, replanting of shrubs and trees must be of native types. The mountains are no place to be experimenting with exotic plants.

The topic of strip mining always conjures up visions of the massive devastation caused by this industry, in the United States. Obviously, it is to our advantage to study the situation in the United States and benefit from this education by avoiding costly mistakes that have been made there, and also by utilizing whatever models and standards that might apply in Alberta.

The State of Montana passed a new Act[1] this year, dealing with the conduct of mining and related activities. While this new Act and its accompanying regulations are a step in the right direction, they contain many of the ambiguities which have weakened attempts at proper regulations for years. Typical preamble to statements detailing procedures, are such discretionary clauses as "to the extent practical", "to the extent feasible", and "insofar as possible". The new law stresses a reasonable degree of protection and reclamation. Considering the range of interpretation to which such vagueness may be open, the Alberta government should go beyond the setting forth of planning procedures, and provide a body of fixed standards.

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[1] House Bill 243
Chapter 252, Laws of 1971
Exacted by the Legislative Assembly of the State of Montana.

The area which has garnered the most publicity both for the extent of strip mining damage, and, more recently, for the excellence of its regulations, is the State of Kentucky. There is much to be learned from the experience of this state. There are many features of its legislation that could be copied, with specific modifications in Alberta, and there is a lesson to be learned from the apparent incomplete success of its program.

Enviable features of the Kentucky system[1], enacted in 1966, are several, but some of the most important ones, are the fact that strip mining comes under a single piece of legislation which creates a single body to administer and enforce the laws. Such a situation, in Alberta would reduce or even remove the confusion and conflict of interests among the regulation agencies. The Kentucky system also places on its reclamation council, a majority of members from the renewable resources departments, or agencies, which are, affected by the strip mining. It would be ridiculous to allow the Department of Mines and Minerals, whose avowed purpose is the development of the mining industry, to dominate any body, concerned with protection and reclamation. Furthermore, judgment of land fit for strip mining, and the acceptability of relamation should be made by professionals excerising their specific competence.

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[1] Kentucky Revised Statutes Relating to Strip Mining and Reclamation.
Chapter 350, 1966
- Regulations - Persuant to the Authority vested in the Strip Mining and Reclamation Commission by Kentucky Revis Statutes. - 350. 028.

Lastly, the requirements of the Kentucky system are specific and penalties are known.[1]

However, despite the apparent toughness of the Kentucky laws, and despite the glowing terms used by the Division of Reclamation to describe their efforts, a Sierra Club report called "The Strip Mining of America",[2] published in July 1971, indicates that the new system has not enjoyed complete success. Improvements have been limited and abusses are rampant. The Sierra Club cites two major reasons for the failure of the regulations in Kentucky, and in other states with so-called tough laws. Steps should be taken to ensure that the same failures do not occur in Alberta.

The first reason is, as might be expected, inadequate enforcement, or simply, lack of enforcement. The government must provide sufficient fund and manpower, to oversee the strip mining industry. While many companies will act in a responsible manner, environmental protection does detract from profits.

The second reason for the failure of regulations in Kentucky, is that what are prescribed are procedures rather than results. That is, the strip mine operators' is merely required to follow certain steps in backfilling, grading and planting, with no emphasis on returning the land to continuing productivity. It is imperative that proposals dealing with reclamation, consider the continued use of the land, after stripping.

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[1] These main points are cataloqued in "Coal Mining Damage in Alberta", Society for Pollution and Environmental Control.

[2] Austin and Borrelli, Sierra Club, 1971.

A comprehensive system of minimum standards should be established and enforced. Beyond this, each company applying for a permit, should be required to submit a plan for reclamation which would consider the peculiarities of particular regions, and the possible uses to which the land could be returned. Companies should be required to prepare an estimate of the cost of reclamation pertaining to the minimum standards set. On this basis, a performanc bond of two hundred percent of the estimated cost of minimum reclamation should be posted, and any company forfeiting a bond should forfeit the right to any furture permit.

Exploration for coal is obvisously essential to the strip mining industry. But exploration raises some special problems of its own. It mitigates against attempts to localize the activity of strip mining. Exploration, to date, has involved, generally the development of road systems, the digging of trenches of varying lengths and depths, and drilling. All of these, and they are usually linked in one operation, result in problems such as soil erosion, and the destruction of scenery. There is a need for more efficient, less damaging methods of exploration. For example, the use of helicopters to transport drilling equipment would preclude the necessity for a great deal of road building.

It is essential that the process of exploration face the same sort of regulations as that of the actual mining. There must be separation of overburden, to allow the preservation of topsoil, enhancing revegetation. Vertical road cuts must be strictly prohibited. If coal is not going to be stripped within a year then restoration should follow closely on the heels of exploration. If no coal is found, then restoration should follow immediately. There must be an absolute ban on exploration in areas where strip mining is prohibited.

The strip mine industry, over the years has embodied the essence of the pioneering spirit. It has encouraged a hasty, careless extraction of a non-renewable natural resource, with little or no thought for a harmonious, respectful relationship with the land. If the highest values of land involve beauty and productivity, then strip mining is anti-land. More and more, however, we the public are becoming aware of the shrinking frontiers of land. Society's priorities are changing, and the terms of progress are being re-defined. We are demanding comprehensive, far-sighted land use study and planning, to evaluate the highest possible uses for land with consideration of meanings beyond the economic. Let us hope that future developments in strip mining will combine, along with a quest for profit, an awareness of, and respect for, the values of land.

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Two Field Trips were Made to:

1. The site of the Canmore Mines Limited strip mine on the slopes of Mount Rundle, conducted by G. H. Stephenson, Mine Engineer.

2. The site of the abandoned strip mine above Ribbon Creek in the Kananaskis area.

QUESTIONING BY THE AUTHORITY

DR. WALTER ROST

You made reference to strip mining at and above the timber line, above the 6,000 ft. level. What strip mines have operated at those higher levels and what are the ill effects if any, have been of those operations?

MR. MICHAEL D. MCIVOR

I am not sure that I can name any strip mines that are now operating but I was thinking particularly of exploration. I would refer you to the Renewable Resources Consulting Ltd. report on the McIntyre Porcupine operation in which they detailed some of the activity that was occurring as high as 6,500 ft. particularly in terms of exploration. I think we all remember the slide shown this afternoon of the alpine area in the Panther region with an exploration road crossing it and the devastation was just heart-rending. I would think that exploration activity in the Highwood area has gone above timber line and this again is an area that should be carefully watched.

DR. WALTER TROST

Your concern here is for the damage on the alpine meadows?

MR. MICHAEL D. MCIVOR

Right.

MR. PAUL BABEY

You suggested in the submission that you would like to see the individual citizens have the opportunity to initiate legal proceedings against companies that are causing environmental damage. Would you care to expand on that?

MR. MICHAEL D. MCIVOR

In the legislation that is passed governing all types of surface mining and reclamation, there was allowance for values to be placed on the esthetic and cultural intangibles, then individual citizens could initiate legal proceedings against a company on esthetic grounds.

4.20 ENVIRONMENTAL IMPACT OF SURFACE MINING IN ALBERTA

Hook and Hackle Club, Calgary, Alta.

Presented by: Wm. Rutherford

Surface mining is a much maligned industry. It is, by its very nature, offensive to the casual surveyor. This has resulted in a great deal of prejudice against surface mining.

We will show you in a few minutes it will take to present this brief that unless present controls are enforced and the additional necessary controls are introduced, all to preserve our environment, surface mining may be among the least offensive surface disturbances.

We will from here on confine our remarks to that area of prime interest to us, streams, rivers and lakes for which there has been considerable disregard in the past. The following are some of the problem areas we have observed and examples of environmental abuse.

1. Pit and strip mining: Disposal of rock and other overburden and refuse has frequently been downhill into streams. Streams have been polluted by chemicals. Ill-advised locations of town sites have resulted in serious land erosion. Example: Crowsnest River and its tributary, McGillvary Creek.

2. Seismic Exploration: Excessive stream crossings, failure to replace and ensure growth of natural fauna on cutlines and cuts on steep, sensitive slopes all have created extreme erosion problems. Example: Prairie Creek in the Strachen area experienced sixteen seismic crossings per mile.

3. Road Construction: This activity has resulted in channelization of stream and river beds. Construction has actually been performed in stream channels. Improper culvert construction has greatly impeded fish migration to spawning beds, etc. Excessive gravel removal has resulted in stream and river erosion. Example: Three Point Creek and Crowsnest Lake. In the case of Crowsnest Lake the road split the lake, spoiling it as a sports fishery.

4. Forestry: Clear cutting resulting in erosion and inability of the land to generate the new growth necessary to prevent erosion. Ill-advised road construction and poor road construction, often evident, is lack of planning of roads resulting in erosion , of hillsides. Clear cutting to waters edge results in bank erosion, removal of fish habitat and raising of the water temperature of the stream, river, or lake.

5. Ranching and Farming: Overgrazing of the overall range or local areas creates problems of erosion, destruction of streams, river and lake banks. Cultivation to streams edge destroying shade, habitat and erosion of stream banks. Excessive removal of forest to develop grazing area can as with overgrazing, destroy the ability of the land to store water so that streams may dry up as a result. Examples: Fish Creek (dried completely the summer of 1971); Dog Pound Creek, Big Hill Springs Creek, Stauffer Creek and dozens of others are no longer the quality fishing areas they once were and are deteriorating annually.

6. Pipeline Construction: Construction on excessive slopes not permitting proper reclamation. Lack of adequate re-vegetation causing future erosion, destruction of stream channels and banks. Failure to reduce down-stream siltation to acceptable limits when crossing streams or rivers. Example: Three Point Creek.

7. It is one thing to complain. It is another to do something about it. The Hook and Hackle Club has always been optomistic about the end result. We have on our own initiative, undertaken to assess the extent of these problems and how the damage which occurred could be corrected. This was done in the following manner.

The Hook and Hackle Club have co-operated with the Regional Fisheries Biologist by sponsoring three student biologists over a three-year period. It was their job to define the problems, determine solutions to eliminate recurrence if possible, and where this is not practical, shorten the duration of such problems as much as possible. This would reduce damage to streams, rivers, and lakes to the minimum and ensure that immediate corrective action would be taken.

Prior to this undertaking, a biological study of Jumping Pound Creek had been done. It was decided that some stream improvement experiments on a particularly barren section of this stream should be undertaken and several devices were installed. Shocking studies, necessary to determine fish populations were successfully undertaken this year showing major populations in this area of both fishable and yearling size. This has demonstrated that damage which occurred in the past is not irreparable.

The studies mentioned formerly, covered the semi-alpine area of the Elbow River, Dog Pound Creek, and Cataract Creek. The results of these studies were condlusive and successful beyond our wildest hopes, so much so, we hesitate to go into detail here.

We are not technically familiar with surface mining operations. However, the damage that has resulted from the land surface uses discussed herein, are almost identical from industry to industry.

Each has contributed to land and stream bank erosion resulting in the heavy siltation of rivers, streams and lakes destroying fish spawning beds, water organism habitat of a desirable type, etc.

Each has, in varying degrees, contributed to the destruction of vegetation along stream banks resulting in bank erosion and in many instances, drastically changing water temperatures which adversly affect the population of our streams, rivers, and lakes.

Many have to varying degrees polluted these waters with varying types of contaminants. You can imagine the results.

It is reasonable to assume that since these various industries have affected the environment of our waters in similar manners that surface mining will do likewise or at least has the potential to do so unless the necessary precautions are taken.

Examination of the destructive sources mentioned in this brief will indicate some of the precautions that must be taken. We would emphasize, of these: (1) An adequate buffer zone to be established to prevent the destruction of vegetation along streams, rivers and around the perimeters of lakes. (2) Proper bridging of streams and rivers to prevent bank erosion. (3) Damage to water sheds be kept to a minimum reducing to the fullest possible extent effects on water flows. (4) Complete avoidance of the introduction of any matter whatsoever to the waters in question. (5) Complete avoidance of an activity that will result in uncontrollable land erosion.

More expert and detailed advise may be acquired from the Scientist with shom we have worked to define these problems.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

How much is "adequate" for buffer zones along streams that might separate a stripping operation from the stream?

MR. WILLIAM RUTHERFORD

We are not qualified to declare how much is adequate. I would expect it would vary from area to area. I have discussed this with biologists and there is no way of settling down a definite distance; each one has to be based on its own merits.

DR. WALTER TROST

Is the weight of your submission that other means of using the surfaces, as well as strip mining, affect the watersheds and the quality of water?

MR. WILLIAM RUTHERFORD

Yes. We are concerned that any industry that might be unfairly descriminated against through legislation would create a situation whereby we would either have to eat crow in effect, or discriminate in a like manner to other industries, which could adversely and unnecessarily affect the economy of our province. We do not wish to deter our economic growth. What we are mainly interested in is that industry as a whole be treated fairly and that we get protection for our streams, rivers, and lakes.

4.21 UNITED MINE WORKERS OF AMERICA

Presented by: Mr. Albert F.Pearce

This is a submission on behalf of the United Mine Workers of America and the Locals of the said union throughout the province of Alberta.

It can be readily appreciated that the union is vitally interested in the welfare of its members, and that any curtailment, closure, or reduction in coal mining in Alberta, whether it be underground or strip mining, will have an effect on the members of the union, due to the non employment of the members.

The coal mining industry in Alberta is an important economic factor in the total economic structure of the province and the members of the United Mine Workers Union rely on this industry for their livelihood and the support of their families.

The workers are also citizens of the province of Alberta, and in this capacity they do not wish to see the land ravished by strip mining, anymore than the environmentalists do. However it will be appreciated that the eye cannot behold the beauty of the unscarred land unless the belly is full.

The purpose of this brief is to submit that the union recognizes the problems of surface mining, the union also recognizes that because of the economies of scale, underground mining is not an alternative answer; both being required to provide Alberta coal with a competitive edge in the international market, and the union submits that this is one instance where we can have our cake and eat it too.

This last comment is based upon the fact that not only can employment be had as well as increased by surface mining, but the environmentalist can have after a short period of disruption, the beauty of an area under a reclamation scheme.

The reclamation scheme itself provides additional employment for more people, and it is not felt necessary to elaborate upon this one major economic problem that not only faces the province of Alberta but the whole of Canada, namely unemployment.

The union hopes that emotionalism will not replace clear thinking, and it respectfully submits that with the proper controls and assurances that the reclamation schemes will be carried out, the government can ensure both the prosperity of the members of the United Mine Workers and the subsequent economic areas of the province which provides goods and services to the workers, and this holds equally true for that sector of the economy that provides goods and services to the company, but that at the end of the usefulness of the mine, there will be provided further employment for those engaged in the reclamation scheme.

The curtailment of mining in Alberta would be a regressive step doing away with much needed employment. The energies and time expended in the submission of briefs and efforts directed at eliminating strip mining in the province of Alberta, it is submitted, would be more beneficially productive if it could be directed towards more meaningful dialogue for the purposes of establishing the guidelines and acceptabilities pertaining to the reclamation schemes.

The attention of the Authority to this submission is appreciated.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

You state, on behalf of your union, that suitable reclamation and production from the mines are not incompatible with each each other?

MR. ALBERT F. PEARCE

This is correct. Public concern in this area is new and if we work at it all parties concerned can achieve the end result that we are all seeking.

4.22

MR. A.L. HARRIS

Mr. Chairman, Ladies and Gentlemen. I am going to try to be very brief and try to touch on just some of the points that I feel have not been touched upon by the conservation groups tonight.

First of all, dealing with the forest reserve. The forest reserve covers the area west of Calgary right to the mountains and from the border of the United States all the way up to the Hinton area. This area, in my respectful submission, is the playground of the cities of Alberta and I think it is very important that every Albertan get this into his head because as soon as he does and understands that this is where the real future of the cities lie, the better off every Albertan will be. What has happened all over the world is that we have run out of recreational area. Alberta has a unique opportunity. It has got this huge area of thousands of square miles just sitting to the west of its main cities, Lethbridge, Edmonton, Calgary and Red Deer. If we could only accept the idea and get it through to everybody in government, that this is a recreational area for all of our people where we can fish and hunt, and camp, and ski, and enjoy ourselves for free, then as soon as that concept is understood then perhaps all the other parts will fall into place.

Good recreational management and good water management go together, one means the other. For example, the speaker who was up here a little earlier about fishing is really talking about good water management for good recreational management. It is important that we understand the value of what I am talking about. About two years ago I went up to the legislature in Edmonton to speak on the Bighorn Dam. At that time I tried to get from the government the cost-benefit analysis on which they were building the dam. I may as well have spoken to the wall because they didn't have one. Finally it came down to the fact that they had received an expert opinion from the company who had been hired by Calgary Power for putting up the dam to supply information of this nature to the government and of course they never went into what the people really were to get out of it.

What I tried to put across was this, you can measure these things. For an example, if an American was coming up to Alberta to hunt or to fish, suppose he is coming up here for a week. He is going to have to pay the plane fare to get up here, plane fare to get back, he is going to buy his goods here, he is going to pay for a guide, he is going to spend money on liquor, entertainment, what-have-you, he is going to have to buy his grub and all the rest, it is safe to say that a day in the forest reserve is worth a $100.00 to every Albertan. On a weekend all you have to have is a thousand Albertans to go up a river or a stream and that is worth a hundred thousand dollars. The fact that the Albertan doesn't pay it out doesn't remove the fact that that is the value for those thousand people. That is why it is so terribly important that we recognize that that forest reserve must be preserved. So when you come to strip mining and you say to me, "We are going to take a million tons of coal out of a mountain and we are going to pollute several streams and we are going to get 10¢ a ton which is $100,000.00.", I scratch my head and say, "My God, that's only a thousand Albertans in that area for one weekend.", it makes no economic sense. This is the point that I feel we have to try to understand.

Now when we drive along the highway and we see Mt. Rundle we say, "What is the value of me looking at Mt. Rundle?" It's a hard one to measure, what is the value of Mt. Rundle to the hippie who is hitchhiking along that road? What is the value of Mt. Rundle to the truck driver who is driving by there after a long day's drive? I don't know what it is worth but I know this, that if they are going to strip an area for 15,000 tons of coal at 10¢ a ton and we are going to get $1500.00 out of it, my God, we must have 15,000, 25,000 cars a day go by there. Figure that out for a year. Why, we haven't even valued the viewing of Mt. Rundle at a penny and I say that this just doesn't strike me as good economic sense.

The problem at Rundle is simply this, if we believe the coal company, the coal companies are saying, "Ten years from now our underground mine may pay for itself, but for the next ten years we've got to build a Walker No. 1 each year for 10 years." That's like a bead, you saw the picture today and that little strip mine was about six inches long on that big screen. You got to figure 10 of those six inches long across that screen. That's going to scar that mountain from one end of it right down to the other by the end of the 10 years. And then what happens? We close it down? What if we die? We have given people 10 years employment and then we have the left the country with the most famous mountain in Canada scarred and it is scarred. You go up there and look at it and I don't care what anyone says, you can put the grass back on there, they got grass all over that mountain up there where the skiing took place and you should see it. It's a messy looking thing and how many years will it take for trees to grow back? I don't know, I am not in that field but I can tell you this, that hill up there where they are skiing it's been that way for as long as I can remember driving back and forth for the last five years and no trees are growing back on it yet. Let's say in 25 or 30 years the trees grow two feet high, has that really restored that mountain? I don't think so.

I say that it is time we faced the Canmore issue squarely. We say to the mining company, if you can operate without stripping Mt. Rundle, then you've got 16 months of coal operations ahead of you on Walker No. 1, fine. For the next sixteen months then the provincial government should start trying to find jobs for the 250 people who are there and then close the whole operation down. And let us spare the most beautiful mountain in Canada. I wouldn't mind if you could show me where that thing is going to operate for the next 50 years and it is all going to be restored.

We have no guarantee of any kind facing us tonight. I say we should be hard pragmatists in this thing and say, "That's going to be closed down, we've got 16 months to find the people alternative jobs." I heard a great deal today from various mine officials to the effect that, for example, the pictures being shown by Kerr were things of the past. Let us talk about the present. Here is the Calgary Herald, September 4, 1971. Take a look at that mess at the top of a mountain. There it is, that's only four months old. These boys haven't learned anything in 40 years and they are not going to learn until you lay down hard, cold rules that they can understand.

Tonight we have had public hearings after the event. This is regrettable, it's too bad these hearings hadn't been heard before the strip mining started but if there is one thing that has come clear out of these hearings to me it is that we should freeze all the mining where it is right now. We certainly should not allow any further mining beyond what is actually going on and I certainly say the exploration work that has been todate, pay them for their exploration and let them go and let's close this nonsense down, because in the long run Albertans are going to be the losers. Because while the rest of the world is short of recreational area, we've got thousands of square miles of it and we can get a lot more money in the long run, just out of taking people up there for fishing, hunting, skiing, snowmobiling, you name it.

One thing we could do if we develop that forest reserve, we take the pressure off our national parks. If I was asked what single thing a conservationist needs more than anything else in the province of Alberta, it's exactly what every major lawyer in the conservation field is asking for and that is the right of the individual to sue. If the individual who is affected can sue then you've got the door open, and the individual knows pollution when he sees it, he knows when he is being hurt and he can then take the steps to protect himeself. You may say to yourself, "Why can't he do it now?" We can't do it now because of a tradition we have had that you must have a property right in order to sue and this has got to end because, like I said, when you are driving along that highway, I didn't have a property right in Mt. Rundle but I have a legitimate concern in Mt. Rundle and I say that I should have the right to sue when my legitimate concerns are affected.

Calgary was referred to by one of the mining men, he said, "Well, we are just stripping a few acres compared to the hundreds of acres that the City of Calgary and the City of Edmonton have grown in the last few years and he is absolutely right. There is no question but he is right. We have been growing and eating up valuable farm lands and that's true but two wrongs don't make a right and I have spoken just as vociferously as I have on Rundle, I have spoken against the growth of cities like Calgary. I said it's time we stopped growing and time we start paying attention to people and I feel the same way about tearing up our countryside. Enough of this, it's time we paid attention to nature and paid attention to the relationship of people to nature because I believe that that's where the real economic as well as the esthetic gain is to be had. Thank you.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

On what grounds are you suggesting the right of the individual to sue be established? On his own right if he is damaged in his personal property rights, or on behalf of the crown as a general citizen?

MR. A.L. HARRIS

No. I think as a general citizen. For example, the fisherman who was here awhile ago, if he goes to cast his fly into a stream and it is all yellow like McGillvery Creek, as he described it, he should have the right to sue for his fishing stream that he has been fishing for years before being destroyed.

DR. WALTER TROST

Would the court not entertain such a suit?

MR. A.L. HARRIS

No, they won't.

DR. WALTER TROST

Do they give a reason for not entertaining it?

MR. A.L. HARRIS

Oh yes, it's very simple, they say he has no property rights in the stream. He is just a fisherman.

DR. WALTER TROST

Most of your comments have been directed towards mining in the forest areas, the foothills, and the mountains. Do your remarks also apply to mining in the prairie areas?

MR. A.L. HARRIS

The prairie areas are less of a problem except when you get to very sensitive country like near Medicine Hat where the army camp is. I guess that's a particularly sensitive area but I understand that in the rest of the prairies, from a couple of mines I've seen, those could be easily reclaimed without too much danger to anybody when they are in production and afterwards. When I speak about the mining, protecting, and the forest reserve with respect to mining, that equally applies to the lumbering. I think this is something that you are going to eventually have to look at because Professor Hamil told me before he left, that from what he could make out lumbering wasn't economic in the forest reserve and it is nonsense to lumber there. We should be taking away old wood perhaps but not making that a lumbering area because it just doesn't justify it. The roads are a major problem, you lose the water run-off and everything else. This is bad for the streams and the water. It is bad for the cities and bad for the prairies.

MR. PAUL BABEY

You mentioned that the individual hasn't got property rights in the stream but recently I read an article about a group that initiated action on the question of air pollution and I don't think that they have property rights to this either.

MR. A.L. HARRIS

They had a class action where they had injury to themselves and they have a right. A class action where you have injury to the parties involved in the way of a physical injury, that's just for the gas plants that's down there to the south of the province. I like that case, but on fishing rights? No. You have to get somebody who has riparian rights and if they want to bring the action you have to guarantee their claims and so on. In England they gradually moved beyond that and perhaps now Canadian courts will be getting close. When I sued on the Mt. Rundle issue I was stopped dead in my tracks and I tried from every angle. What I tried to say there was that the Premier is the trustee of all the crown land on behalf of the people and I am one of the people and therefore he is in breach of trust to me. Just as if my bank had gone and taken the money out of my bank account. He is in breach to me and they said "Very nice but we are not quite ready to entertain that kind of an action now."

MR. PAUL BABEY

Yes, but I was thinking there is a difference if you are intending to sue a government or a company.

MR. A.L. HARRIS

If you can show an injury to you, a form of physical injury, you can sue as a private individual of course.

MR. PAUL BABEY

I suppose the difficulty is to prove that fishing can eliminate the health hazard then.

MR. A.L. HARRIS

Well, there you are. I am talking about the forest reserve area now, this is crown land, how do I sue? I am just an individual, they say to me, "You are just one of a million Albertans, you have no more right than any other of those million Albertans and get lost." I say you should put in a bill of rights of Alberta, a right of the individual to sue the minister who is the trustee of his rights where he fails to enforce those rights, the protection of your rights.

MR. ALAN CARTER

I'd like to ask a question about benefits to workers that are affected by the mining process. Could someone give me an example and tell me how many workers are employed by the operations on Mt. Rundle and the effect also on heavy machinery in the operation. How does it affect the amount of employment available to Albertans?

MR. H.G. STEPHENSON

Mr. Chairman, the question I believe is how many men are employed in the strip mine on Mt. Rundle. On the strip mine, 25 at the moment. If you try to work out how many men are employed in treating the coal and loading it in other parts of the operation, you would probably come up with about 50 men altogether, employed by Canmore Mines directly or indirectly in connection with stripping operations. I am not quite sure I understood the question about the effect of heavy machinery. Operating heavy machinery on very dry country can obviously create a dust hazard, vibrations, I wouldn't think there is any danger there. I really can't add anything very much to that.

But if I may take the opportunity while I am at the microphone, Mr. Chairman, to answer one or two questions that were posed in the last hour or so. Mr. Storey, I must thank him first of all for his kind remarks about the officials of Canmore Mines, it's very gratifying for any company to hear that people appreciate that they are trying to do a good job, not always succeeding. It is very difficult to answer Mr. Storey's questions, he posed quite a number and I tried to take some of them down and I may not have been very successful. If I don't answer these adequately now I'd be only too pleased to meet him and any other members of his committee and go into these in a lot more detail than I can handle at the moment. But Mr. Storey did ask whether coal rights could not be exchanged for Canmore Mines' present mineral rights. This will be a dickens of a problem because we have our installations at Canmore, we have our preparation plant, we have our branch lines, we have our housing there and everything. To find mineral rights which are at present unknown to substitute for these would just be a tremendous practical problem, I can't really see it being done.

Mr. Storey mentioned that he will be very upset to see a company like Canmore having to close down without having been able to completely reclaim all of the existing or future strip mines. This wouldn't be done. We are owned by a corporation, an American corporation unfortunately, Dillingham Corporation of Honolulu. In my short experience of the last 12 months with them (they bought Canmore Mines just over 12 months ago) I must say in all honesty that I never expected an American Corporation to reveal such a sincerely conscientious attitude towards the development of a property in what to them is a foreign country as they have done in the last 12 months. I myself am very much inclined to feel that if another company had purchased Canmore Mines and had not given the facilities for doing reclamation and work properly that Dillingham Corporation have, I would no longer be with them. I can only say in reply to that question that we have amounts of money set on one side which I am 100% confident is sufficient to restore the land to, not to its previous state because that can never done once strip mining has gone on, but to what

I believe will be acceptable to 99% of the people. I think there would be the 1% of the people who would not be satisfied with anything less than land return to absolute normal and this we just can't achieve.

Mr. Storey mentioned how it would be desirable to try to hide future operations from the top of Harvie Heights Road and I am 100% with him on that, the slide I showed earlier this evening was actually taken from, not from the highest road on Harvie Heights, from a road actually level with Mr. Storey's house, I am not quite sure which road it was. We have, since we opened that first strip mine Walker No. 1, we have realized that we made one mistake. On looking back on it now I can kick myself for it but it's one of those things that is very easy to see afterwards. It wasn't very easy to see at the time. A strip mine is divided into three parts; two spoil heaps, and the mine excavation in the centre. You usually have an upper spoil heap, a lower spoil heap and the strip mine in the centre. In a case of a mine on a slope like the lower slopes of Mt. Rundle, the lower spoil heap is naturally hidden by the trees on the lower side of the strip mine, providing that the spoil heaps are not made any higher than the 50 ft. tree height that exist in that area. Hiding the mine itself and the upper spoil heap is a problem. It is not hidden in our Walker No. 1 strip mine because we didn't leavy any trees in between the spoil heaps and the mine and between the mine and the upper spoil heap. But we now realize of course that if we had left a 30 or 40 ft. belt of trees between the mine and the upper spoil heap, and made roads through this belt at say 200 ft. intervals, we could have carried our spoil to the high side of this belt of trees and we would have cut down the exposure, I don't know quite by how much, you could only tell by actually drawing it out and this I haven't done but I would imagine you could cut down the exposure I showed on the photograph by at least 50%.

To try and answer another question of Mr. Storey, he mentioned that he'd be very upset to see strip mining all the way along the Canmore corridor. This will definitely not take place. The coal seams are just not sufficiently continuous to allow strip mining to take place along the full length of the Canmore corridor. If I was asked to make an estimate I would say that coal seams which can be mined economically by strip mining would not extend more than 1/6 of the say along the corridor.

I'd like to make some comments on the last speaker's brief. Mr. Harris' main theme I gather was that the area west of Calgary and west of the cities of Alberta is a playground for the cities. He made the point that if we are going to scar Mt. Rundle by our strip mining operations, and I had hoped that I proved in my brief that the effect on Mt. Rundle would not, in my opinion only, be a scar. The effect on Mt. Rundle, in my opinion, would be to create grassy areas where we now have a dense timber on the lower slopes and I don't feel that the grass replacing trees is necessarily a scar providing that the grassy areas are irregular and blend in the the surroundings. Anyway given the argument possibly it is a scar.

Mr. Harris then says, right we'll close down mines, put 250 people out of work. To be quite honest I just can't accept that. These 250 people, they are people, people have homes. I have a house in Canmore, I have a lot of money tied up in my house and so do 500 other people in Canmore. O.K. shut down the mine.

Find these other 250 people jobs. What kind of a job is Mr. Harris going to find for me? What kind of a job is he going to find for Ed. Fisher, 50 years old, contract miner, scars all over his back, for the last 20 years has been digging coal. He's got a very fine character. If you offer him a job, as I said before in my brief, pumping gas or selling plastic tomahawks to tourists how is Mr. Ed. Fisher going to feel? I'd mentioned that if you close down the mine you close down Canmore and I believe this to be a fact. If you multiply my case, you close down Canmore you do me out of a job and I don't feel too happy about that. My property becomes valueless, I have to move somewhere else, maybe I get a job that is satisfactory to me, far more likely I don't. You already have an unemployment rate in Alberta which I believe is 7%. Do you want to add to that? So that the people of Calgary, the people of Edmonton can have a playground to the west? It is not only a playground to me, it's also where I live. I would suggest that before the people of Calgary, and Mr. Harris in particular, suggest that we close down Canmore Mines, create a playground out there, reduce the value of my property and verybody else's, do me out of a job, I would suggest that before he does that, first the City of Calgary create a playground in Calgary. That they stop dumping snow and salt in the river, they they get rid of the wreck car lots, stop dropping concrete blocks in the river, create some green space in the City of Calgary so that they can enjoy their city. I don't wish to be boastful here but to my mind Calgary has the most undesirable car lots that I've ever seen in any city in which I've ever lived. I suggest first of all that they create a sewage plant in the City of Calgary which is capable of treating the sewage that they put into the Bow River. I suggest that if you imagine Calgary 80 years ago you can see rolling hills with a beautiful river going through and what have you created? A dump of concrete blocks alongside the river. Certainly I think we can be forgiven in Canmore for saying before you start wanting to close down our town and close down our mine, put your own backyard in order. Thank you, Mr. Chairman.

MR. ALAN CARTER

Regarding employment my question is, how much does the strip mining industry benefit the Alberta workers, when you consider the effects of the big machines which I believe are often driven by people outside Alberta. That's something that quite bothers my mind but my main question is, how much does the strip mining industry offer to Alberta workers?

FROM THE FLOOR

The statistic that Mr. Barnes quoted this morning, Dr. Trost, is this: That the industry presently employs 2,500 people at a payroll of $18,000,000.00.

MR. A.L. HARRIS

I would like to reply to the Canmore official. First of all, if you followed what I said, what I said was this: Facing the fact that we are going to have a continual stripping along the beautiful Mt. Rundle and eventually will end up with a scarred mountain. Assuming that to be correct, then I said: What we should do is talk now about telling the mine that Walker No. 1 is the last pit they are going to dig and if there is going to be unemployment created as a result of it, then we've 16 months, as a province, in which to work about finding alternative jobs for the people. There is no use coming back to me and saying how do you find a job for this guy or that guy because, tell him, if your Dillingham Corporation decided tomorrow morning to shut down that operation they have to find other jobs because we are all in that boat. The only thing we can do fairly is take that time and find alternative work. That's my main point.

Something I didn't say when I was up before, I overlooked saying it, from what I could make out from what I had seen of the site and from the people I had discussed with, it's most unfortunate that I had to tangle with Canmore Mines because Canmore Mines is probably one of the better operations, if not the best, in the province and they are a very fine company from what I can make out. I want to say that right now and it's not with any ill-will towards Canmore Mines at all, it's just that somewhere I have to say that that whole forest reserve is for all Albertans and must be preserved for the future of our province because I say that's where the wealth of our province lies, and I say that's where the welfare of the people of Alberta lies. If I am going to draw the line then let's start drawing it right now. Let's not leave everybody go in and spend money and tear everything up and then say perhaps we should stop it. Let's get at it right now and stop it and the way to do it is call a moratorium right now on the whole business.

MR. PETER MCFARLAND

I am a geologist. I have attended the hearing today and tried to view it as a private citizen but I found it a little difficult after a while. What I would like to do now is comment briefly on some of the points that I think have been either touched upon in previous submissions but haven't been offered from a viewpoint more of a private individual, and some points I think have been missed although I will now admit to having missed the first half dozen submissions. I will try to be brief on each of these.

One thing that I didn't hear this afternoon or this evening was the fact that reclamation costs should in all likelihood go down in the future, not up. Reclamation itself of course is a labor-intensive activity and particularly in the case of reclamation in the order of $10,000.00 an acre and so on. I think you'll find that a lot of that was spent strictly for labor and very little for material. In the case of work in the foothills, this will again be true, most of the expense goes to labor.

Secondly reclamation methods aren't definitive at the present time. That is not to say, as one speaker did, that you cannot improve the ground by reclaiming it. When I was working in coal which I am not at present, we did our studies and knew of some studies where it was indicated that the surface to be treated could be returned to a better state than its original state. I base this on areas in the mountains where you have vagaries of climate and wind conditions and not what you would call solid or even distribution of seedings. Another thing that doesn't seem to have been mentioned is that in any reclamation, while it may be slow in the mountain areas, revegetation for instance with trees or shrubs will eventually produce a result similar to what it is today.

There is one other item that is related to this, I hate to bring it up because the forests of Alberta are definitely valuable, but reclamation in areas that would be reforested involve a small percentage of even one year's growth that is destroyed in forest fires. I am not saying that we should compare them but I am just pointing out that it is there. You lose more vegetation to forest fires and while I agree that the reclamation regulations must be stringent, there is no doubt that reclamation can certainly be effective.

There is of course the allied fact that nobody is going to do strip mining or even open pit mining where another better method will suffice and by "better" I mean more economic. There is also nothing to indicate that in the future, then years from now, even 15, better methods may not be found, particularly as you go deeper, particularly as your markets change for the grade of coal because as you have probably been informed a grade of coal will vary with the area.

I have a question, I don't ask for an answer right now but I simply point it out. I think that the point was very well made, one of the problems on the plains as opposed to the foothills, is the return of the land to the farmer. I only question the method suggested in the submission by the Unifarm representative, that the land be bought back by the farmer at current market prices after a given time which is governed by a variety of factors. I think that under those circumstances, and I admit that I am basing it on 30 years experience of life and inflation, the individual may not be able to buy back under those circumstances. While I agree that there is a possibility the mining company may be forced into farming, most mining companies won't do it too willingly unless there is a good chance of making money. I would suggest that, while it be considered that the land must be returned to the farmer, allowance be made for other methods. For instance the use of the prior bid or the possibility of right of first refusal to the individual who originally owned the land or someone that he may appoint as his successor or heir and so on.

There is one question related to the intangibles that you have heard mentioned, no one seems to be able to quantify the intangibles despite the attempt based on 10¢ per ton royalty figure for coal. Incidentally, and I expect most people here realize that, this is not the only economic advantage accruing to the government and therefore the people of the province. There are such things as lease fees and of course that's outside the economics involved in employment. But how do you assess the spots that will have scenic value and who is going to have the authority for doing this if you wish to close down certain areas to mining? I submit that it is very difficult and a problem here is a problem faced elsewhere. You have to mine where you have what you can mine economically. I admit that you can also make the argument that you have to leave the scenery where it is, you can't move it around. I agree that there is no easy answer to this but I do not think that you will get an assessment of scenic spots that will be acceptable to everyone. It's just possible you will get an assessment of scenic spots that's acceptable to a majority of the population but I even doubt that.

The concern with water quality and water quality control has been mentioned but I haven't heard anyone specify anything that they thought should be in the regulations. While it may seem obvious to the members of the Authority, I would like to point out that the easiest way of approaching this of course is to require an on-going program of water study. Water sampling and water control not only in the immediate activity area of mining but in all the surrounding area that may touch on the ground waters. This, I admit, presupposes study of ground water and of stream development in the area within which mining may take place. But I think this is necessary, it's already done in many other parts of the country in different types of mining. Ground water movement in the mountains is not totally understood of course and you need not worry so much about water in the actual location of the mine. Most mine operators will tell you they don't need any more of it than they get. It's water that may be diverted around the mining area or may be affected by the mining operations that is of concern. Here groundwater, not just stream water, can be controlled and its movement controlled if it is studied early enough.

One other thing I have not heard mentioned is the possibility of trying to coordinate these regulations with regulations that may be proposed in, for instance, British Columbia. I say this because in the southwestern part of the province you have an area adjoining where you have exactly the same conditions, and for ease of operation this would almost be a necessity. People have spoken about the destruction carried out during exploration, for instance, trenching, access road building, and drilling. Exploration itself is an uneconomic phase of employment and can only be supported by success in mining. If designated areas are presently now listed as being closed to the possibility of mining within which exploration on a large scale has been carried out, and most explorations for coal in the mountains have been on a large scale because exploration and development generally go hand in hand although they may often be separated and certainly be separated from the mining.

If these areas are likely to be closed to mining, you lose all incentives for exploration and while the question may be raised, "How many people do you employ?", I am a geologist and I know a lot of people that are employed. You do not employ strictly the exploration workers, you employ all the contractors who work on the exploration program, for instance, building the roads, doing the drilling, operating the equipment to give us the trenches.

The equipment problem has been mentioned, large equipment will obviously not be used in small deposits, you can't handle it and people have worried about turning to larger and larger equipment. This can be controlled very simply.

One further point, the problem of enforcing regulations. Statements of the regulation will have to be in the plainest language possible and yet provision will have to be made for any specific area or any specific operation in that, if this is not done, you get the problem of different people interpreting the different statements differently and I am referring in this case to the authorities enforcing. For instance, I use as my example, differing views held by different forest rangers and their employees in different areas of southwestern Alberta with respect to the reclamation requirements. This can simply be avoided by use of the central authority. I have a few other points but those are the major ones. I am particularly concerned with the possibility of trying to coordinate regulations with British Columbia, and the seeing that water control is carried out because most of the concern for watershed destruction can be avoided by proper preventitive study.

MR. PHIL SHIRLEY

I'd like to be known as a wage earner. I am in between the owner and the other people that have submitted their briefs today which I have listened to. I'd like to put in that I've been in construction for 25 years. I've worked in every province in Canada. I built roads, dams, you name them, I've built them. So I have upset a lot of ecology. Some for the federal government, some for the provincial government, some for industry. But this has been my life and it's still my life I hope. Now what I find out is that the companies are putting in briefs offering suggestions trying to help, trying to go with the government. I'd like to, at this point, change and say that I have lived in the bush maybe half of those construction years, I've worked with the hunters, the fishermen and I've seen what happened. I don't want to knock anybody, this I won't do, but I have yet to see one brief come out from all the other ecologists telling how they are going to take care of the ecology that they want kept for themselves. It's a lot of work, it's a lot of money. This was one question that I would like to talk about, is the recreational dollar. A lot of people here today, or most of the people here, are all for going to the mountains. Myself, I spend 80% of my time in town playing hockey and sports with the young kids who can't afford to go to the mountains and I'd like to see a good portion of that dollar come my way. Thank you very much.

THE IMPACT ON THE ENVIRONMENT OF SURFACE MINING IN ALBERTA

PUBLIC HEARINGS
AT
RED DEER

MEMORIAL CENTER
JANUARY 6, 1972

ENVIRONMENT CONSERVATION
AUTHORITY

5.1

A BRIEF ON
STRIP MINING AND THE ENVIRONMENT

by the

Professional Staff of

The Red Deer Regional Planning Commission

Presented by

Mr. Robert Cundy

December, 1971

The following is a brief on Strip Mining and the Environment prepared by the professional staff of the Red Deer Regional Planning Commission. The comments and recommendations contained within may parallel the feelings and thoughts of member municipalities within the Commission but they do not necessarily represent their opinions, and thus the brief must be considered as a positional paper of the professional staff of this Commission.

Our comments are arranged under various headings for the sake of simplicity and hopefully logical argument. In some cases the comments are sketchy because the attached report (draft copy) elaborates in some detail upon the comments. Furthermore, to avoid repetition some aspects discussed in the report are not discussed in this written portion of the brief, although it is felt that the major points of interest to the Environment Conservation Authority are considered within this brief.

Interest

As planners we are very interested in the condition and quality of the present and future environment of the Province of Alberta, as well as other regions, and it is felt that this interest must be conjunctively integrated in any considerations and decisions for the economic and social development of this Province's resources, both physical and human.

There is coal strip mining activity within the bounds of the Commission and this staff is presently completing a study on the involved area. The resultant report considers many aspects, including the resource base, land tenure, land use, mixed land use problems, strip mining problems, reclamation, legislation and attitudes, and thus it is considered to be a fairly detailed examination of the existing situation. Thus, not only do we have a passive interest in strip mining and reclamation but also an interest through active professional involvement.

Situation Statement

It is felt that economic development in Alberta should be encouraged but that it should not occur as a detriment to our physical and social environment. With the expected increase in population growth, industrialization and, consequently, energy demands it is felt that strip mining activity should intensify within the province and because of this strong, positive reclamation controls are required for all the lands in Alberta. The existing Surface Reclamation Act was a step in the right direction when passed in 1963 but it has basic inadequacies, which are discussed later in the brief, that should be corrected through new legislation.

It is realized that strip mining in many locations is a superior method to deep mining because of economic, safety and health benefits. Therefore, when the benefits of strip mining outweigh its demerits this system of mining should be used except where unrepairable environmental damage would occur. Strip mining can create land use and environmental problems through conflicting resources demands and poor mining and reclamation practices, but with wise planning and action these problems could be minimized or made non-existent.

Staff Observations on Current Strip Mining

In the past history of Alberta and other parts of the world, wherever strip mining has occured, invariably strip mining operators have had, at some time or another, poor reclamation records. This is partly the fault of the operator, who often cared little about the end product of the stripping activities, and of governments, who should have passed legislation to care for the environment but did little to advance this. Neglect of the environment was a result of the universal attitude that land was plentiful and consequently portions of it could be destroyed or lost from production without any noticeable loss.

In the past thirty years, however, environmental concern has increased and especially intensified in North America over the past ten years such that governments and the public are demanding resource (land, water, air) conservation and reclamation practices as well as restoration action in many areas. Even resource based industrial firms, partly through their own concern and partly through their awareness of public and governmental concern, are utilizing more and better conservation practices. Strip mine operators are one example of this.

In Alberta strip mining operations can be classified into two areas of activity. One is the prairie region and the other is the uplands, consisting of the foothill and mountain regions. Basically, on the prairies strip mining directly affects agricultural activity by disturbing productive soils and in the foothills it affects, either directly or indirectly, the forest industry, recreation activity and valuable watershed areas. While it is believed that problems in the upland areas are more severe, problems also certainly exist in the prairies although they are often neglected in favor of the foothill and mountain regions. It is felt that other briefs will adequately concentrate their comments on the upland zones, so this brief restricts its comments to the prairie regions, specifically that area of coal strip mining activity in the Halkirk coal field on the lands immediately south of the Battle River.

The location of the strip mining activity and its related power generating plant in this area is undoubtedly economically advantageous for the local municipalities but the activities are causing concern, and rightly so, about the deterioration of the environment. In this area stripping activities have occured at an appreciable scale since the late 1940's and at present approximately 50 acres of land per year are stripped south of the river. It is gratifying to see that reclamation experiments have taken place but it is disconcerting to note that none of the experimentally reclaimed areas are suitable for re-use by any activity, farming or other. Where vegetation is sufficient to support cattle or game, the local relief and topography is not suitable, and vice-versa. It is realized that there are numerous and varying problems for reclamation, but the local and universal experimentation and results it is felt that the period of experimentation should be ending and that practical action which results in immediate, high standard reclamation should soon commence such that the land may be re-utilized within a short period of time.

Surface Reclamation Act

Although the Surface Reclamation Act has some good sections and good intentions, it does have some basic inadequacies. Since the Act is administered by the Department of Mines and Minerals and the Reclamation Council is chaired by the Deputy Minister of that department, the Act and its regulation could have a bias toward non-renewable resource activity even though it is intended for the conservation of renewable resources. Thus, a basic conflict of interest is promoted by the Act. Also, the Act does not apply to all lands within Alberta thereby increasing the chances of inconsistent reclamation regulation and practices within the province. Furthermore, the Act does not stipulate any definite reclamation procedures, nor is a performance bond required to be posted by the operator to guarantee their sincerity toward adequate reclamation. In addition, the operators are not required to preplan their reclamation procedures prior to stripping the land which contributes to the eventual inefficiency in proper reclamation. The Act does not restrict the composition of the Reclamation Council to that primarily of men who have professional or technical qualifications related to the subject, which could hinder the quality of the Council and consequently, perhaps, the quality of its advice and decisions.

Environment Conservation Authority Position Paper

It was heartening to learn that the Alberta Government, through the Department of the Environment and the Environment Conservation Authority, was going to study surface disturbance activity and subsequently prepare new legislation for surface reclamation. The Authority's position paper does much to advance the basic concepts on the philosophy and principles of legislation which will be proposed, although it is realized that the paper is neither in final form or exhaustive in scope. However, as intended it does provide a basis for comment, upon which the remainder of this brief is devoted to, in accordance with the sections and subsections used in the position paper.

Philosophy of Proposed Surface Reclamation:

2.2 It is agreed that environmental capacity for change and stress should be emphasized within any new legislation. Consequently any development should be preplanned such that all activity would minimize the detrimental affects on the environment and increase the ease of efficient and effective reclamation procedures. Emphasizing prevention should enhance reclamation.

2.3 In conjunction with 2.2 it is a natural philosophy to define "development" as including studies on environmental capacity and alternate 'development'. These pre-studies should be undertaken by the developer as a cost of operation.

2.4 The "polluter must pay" concept (environmental damage is a valid form of pollution) is an admirable one but in most cases the consumer of the eventual product is actually the one who pays. Therefore, much emphasis must be placed on the prevention of damage through preplanning and strict environmental control.

2.5 It is agreed that if resource developers had to employ effective development and reclamation techniques in order to retain the right to continue development, then legislation should contain segments on lease and development agreements which would compel resource developers to utilize proper development and reclamation methods.

2.7 It is firmly believed that a Surface Reclamation Board which has jurisdiction over proposed and active surface disturbance activities, including strip mining, pipeline construction, oil and gas drilling, etc., over all lands in Alberta. Such a Board must be composed of members appointed from all governmental departments, sub-departments and agencies which have an interest in the preservation of the environment and the economic development of Alberta. These would include Agriculture (Soils, Economics Division), Environment (Water Resources, Environment Conservation), Lands and Forests (Forest Land Use, Timber Management, Fish and Wildlife), Mines and Minerals (Mines, Minerals, Pipelines), Industry (Alberta Power Commission, Industrial Development), Highways, Energy Resources Conservation Board and any other body deemed necessary.

This Board should have a full time director or chairman who presides over all activities of the Board and consequently should hold no other post within the government or province. A small staff of competent professional and technical people would be needed to co-ordinate the activities of the Board. The Surface Reclamation Board should be an agency of the Department of the Environment, thus being divorced from the departments where resource development is emphasized.

Within the Board there should be participatory planning, study and decision making from all departments and agencies involved, as well as from local municipalities where surface disturbance is taking place who could voice their feelings on activities within their own areas. It would be up to the Board to maintain consistent regulation throughout the province.

Therefore, although duties could be delegated to certain members of the Board in each case as seen fit by the Chairman, it would still be the duty of the Board as a whole to listen, discuss and decide upon the information and feelings forwarded to them by the responsible Board members, local municipalities and developers.

Conceptual Framework

3.1 The definition seems to be very adequate in its comprehensive form.

3.2 It is our thinking that surface disturbance legislation should be equally applicable to all lands within the province.

3.3 The comprehensive nature of this proposal is valid in light of the aforementioned philosophy that 'development' should be defined to include all stages including exploration, planning, development, operation, processing, transportation, storage, servicing, reclamation, abandonment and maintenance.

Principles Included in the Proposed Legislation

4.06 This is a wise proposal in that development proposals need to be reviewed prior to these three development periods if comprehensive environmental planning is to logically occur and be controlled.

4.07 It is of the utmost importance that the reclamation of disturbed lands proceed simultaneously with operations (e.g.`strip mining) in order that the period of disturbance is limited. Only in this way can productive agricultural land, for instance, be brought back quickly into use within a two to five year period (a much shorter period than under present reclamation requirements) and thus the requirement of such a result should be so legislated.

4.08 Regarding surface disturbance activities, there should be legislation for the control of the following by providing specific regulations within the legislation: where needed -

(1) preplanning final land surface and use
(2) stockpiling topsoil
(3) hauling of overburden
(4) respreading topsoil
(5) minimize vegetation removal
(6) revegetation
(7) providing drainage channels, settling ponds
(8) fencing off dangerous or nuisance areas
(9) clearing and tidying
(10) treating and reconditioning disturbed surface
(11) adequate maintenance
(12) maintaining coherent transportation pattern

4.09 These guidelines are necessary but often they are only minimum provisions and thus the legislation should include a clause where the restrictions and regulations could be to a higher standard where seen fit by the Surface Reclamation Board (or other authority).

4.11 The retroactive feature is a desirable one in any such legislation and it is heartily encouraged although some problems are foreseen in determining the retroactive period and in enforcement.

4.12 A security deposit or performance bond is certainly required if the sincerity of the resource developer toward proper development and reclamation procedures is to be assured.

4.13 This deposit should certainly be forfeited should the operator not comply with the required work and, in addition, the legislation should provide the means where the government would have a legal course of action to obtain money, in addition to the deposit, from the developer for all work required to bring the worked area up to the required standard.

Needless to say, all subsections in the position paper not comments upon in this brief are agreed with by the staff in this office.

We thank the Environment Conservation Authority for allowing us the opportunity to submit our brief and hope that it helpfully contributes to the task asked of the Authority.

R. R. Cundy, M.T.P.I.C.
Director

W. G. A. Shaw, B.A., M.A.
Assistant Planner

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

Are you suggesting that sub-regional planning for the west country be legitimately done in that area alone?

MR. ROBERT CUNDY

Yes. We have to start someplace and I think that would be a proper approach. If we look at the area from Rocky Mountain House over to the boundaries of the National Parks it would give us a total picture of commissionary-run parks that include the County of Paintearth. It is necessary to do it in steps to get an appreciation of the problem that this is not a total regional concept or regional plan developed in the Dominion of Canada. The Province of Alberta has had Regional Planning Commissions since 1950,therefore,we have the nucleus for this phase of work as some commissions have about 50% of the regional studies completed.

DR. WALTER TROST

Would you list some of the factors that are important and should be looked at in the sub-regional plan.

MR. ROBERT CUNDY

We should be looking not only at the industrial potential but at human and natural resources, road networks and recreation potential; and at this in relationship to the total picture of the Province of Alberta. We are hoping that through the Authority, you will be able to encourage the Provincial Government to look at the need for sub-regional work and sub-regional plans. It is extremely important that this be put in a total picture when it is being related to provincial guidelines.

DR. WALTER TROST

You described your view as to how regional planning, as a study, might develop with inputs from several groups that you mentioned. Would you elaborate on how, once planning has begun or a study has been developed, one might move forward from that point toward the implementation of such a concept.

MR. ROBERT CUNDY

This is one of the problems which I can foresee and is in fact obvious in the planning legislation of the Province of Alberta. While it is possible for the Regional Planning Commission to be responsible to itself and to the member municipalities we find ourselves in the position that, unless the municipalities independently endorse particular sections of the plan, it is very difficult to have the plan workable. There is no financial assistance available for the Commissions to implement proposals such as, conservation, recreation development, or studies on the protection of the total environment. This is where the legislation is very weak and I would hope that through your office, you could perhaps strengthen that section of the planning act.

DR. WALTER TROST

Do you anticipate problems of resource development impinging in a harmful way in the watershed areas that are to the west?

MR. ROBERT CUNDY

This could develop if we are not careful in our total plan. We have the prime concept contained within our submission. There are two or three areas where dams are suggested, one around Rocky, one around the Bighorn and there is the Cartier Dam by Sundre. Without total planning or without total examination of the area, it could in the years to come, be very concerning.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

In your own judgement do you believe that high quality reclamation can be achieve within the economics of prairie strip mining?

MR. W.G.A. SHAW

No, the price of coal would have to be increased.

DR. WALTER TROST

Do you know by how much?

MR. W.G.A. SHAW

A very rough estimate would be, if the cost were 7½ cents on the ton for coal then this would cover the cost of reclamation on an average acre basis.

DR. WALTER TROST

Your suggestion is that since most of this coal is consumed in the utility, that the cost be borne by increased rates for the electricity.

MR. W.G.A. SHAW

The environmental benefits which would result from the economic re-use of the land or for recreation would justify the increased rates. If this is done in several areas however, the cost may be increased too much and subsidization of some sort would be required.

DR. WALTER TROST

In any reclamation program the land is returned to an ultimate user, whether it be the farmer or a recreational user or some other. How should the ultimate user be brought into the pre-planning and the planning process?

MR. W.G.A. SHAW

I would think that the local municipalities should be involved. In all probable cases the land could be, or should be, reclaimed to a standard sufficient for farming and therefore the surface reclamation council and the development company should be in contact with the local municipalities to provide guidelines and liaison between those bodies and the individual who would come in after.

MR. PAUL BABEY

You mention the cost of reclamation at about 7 1/2 cents per ton. Have you any figures on what the costs are per acre?

MR. W.G.A. SHAW

Approximately $600.00 per acre. This is to a very high standard.

MR. PAUL BABEY

Would this reclaim it to the point where it is suitable for agricultural production again?

MR. W.G.A. SHAW

It should. As I stated in the report, this is an interim study and further detail and examination should result but we feel that this figure is a close approximation of the costs involved.

MR. PAUL BABEY

In your earlier remarks you mentioned that about 50 acres per year were being lost to agricultural production. Is that lost during the time that it is being mined and reclaimed?

MR. W.G.A. SHAW

This is correct but the experimentation period in the area that I studied has accrued within the last ten years. My own opinion is that to date the land is not utilizable for other means therefore it has been lost. The mining company does intend to further reclaim the land so that it can be reutilized hopefully.

MR. PAUL BABEY

Have you any idea of the time interval from the time the mining operation is completed until the reclamation is completed?

MR. W.G.A. SHAW

With high standard stripping; immediately filling in the cuts, burying the toxic overburden and providing top soil for re-growing grasses and then leaving it for a period of years to revitalize the soil. It could be a period of two to five years before the land would be ready for reuse.

5.2 COUNTY OF PAINTEARTH COUNCIL

Presented by: Mr. Guy Tomilson

I will be brief because my position is very much that which was outlined by Mr. Shaw of the Red Deer Regional Planning Commission. A council of the County of Paintearth is very aware of the benefits of the full operation of strip mining and the production of electrical power. It has reached a magnitude which is a tremendous asset on the tax base and at the moment the two industries almost equal the complete value or the assessed value of the farm land within the county so you can see the fact is very great and we are very aware of the benefits that confirm this.

The Council doesn't want to take any position to interfere with the complete development but they do feel that it is also an essential part of this operation to see that the work is tidied up after the work is done. We have examples some 30 years ago where strip mining operations were carried out on a small scale. The open pits were left and are still there. The barren piles have never re-grassed themselves naturally and the pits have areas of blocked water and are a hazzard for stock and people. Nothing has been done about improving this and the situation could well exist on a more modern and up to date operation. In the old operation those that did the work are gone. The companies are bankrupt. The people that ran it are dead. There is no possible way of collection from that operation to repair the damage that was done.

We are glad to see that the present government and the commission and the Authority are working at practical methods of correcting these problems with the sparing of the land long before it is left and abandoned. The Council feels that to a large part the reclamation works should be paid for from the proceeds of the business. It is nice to think of money coming in from an outside source, usually the further away the source is the more remote we feel it is and it doesn't really belong to us. If it is federal money, a little assistance there is excellent.

If it is provincial money that is also found money but not quite as remote. We have a little more connection with it but when we read that there is a one hundred million dollar deficit in the provincial treasury last year, I think the provincial government will have to take a look at very many different sources of raising revenue to keep the normal programs of the country and of the province going. Therefore I believe that they will think in terms of raising money from the production of the coal itself.

I think they are aware as we are aware that all of this is a price business. If the price of coal gets too high it can't compete with natural gas. There will be a large pipeline of natural gas being put through the country this coming summer within three or four miles of the utility plant. With this in mind, these factors have to be weighed and balanced very, very carefully rather than hurting the coal industry to keep it in a competitive position.

Last fall at our convention of the Rural Association of Municipal Districts and Counties in Edmonton, the Premier intimated to us, that his government was taking a very hard look at increasing royalties on the natural resources in the province and I think that that factor in itself will most likely be the levelling factor which will keep coal competitive with natural gas for electric power production. We would like to recommend that in this whole program that provision be made from some source; possibly not legitimately tied to the present production of coal but to provide a small amount of funds available to repair damage that has been done.

As I mentioned previously, thirty years ago the damage is still there. Not a large area, only ten to fifteen acres, possibly twelve acres. But it is very rugged and it is very unproductive and there it stands. It would not take more than a number of years of progressive work to put it back into the excellent land that it was at one time because we do not have the soil acidity factor there, however, this should be incorporated into an overall recreation program for the province of Alberta and it is the council feeling that this should be legislated and properly carried out. We are pleased to see the action that is being taken and there is just one other thought that we would like to leave with you that when you dig a little hole in the highway to Banff and everybody sees it there is a lot of fuss because there are a lot of people going by on this highway. We in a little bit more remote position do not want to be overlooked so we would like to recommend to the Authority that you don't forget us. Thank you.

COUNTY OF PAINTEARTH

"MULTIPLE LAND USE PROBLEMS"*

CONTRIBUTING STAFF

Director	R. R. Cundy, MTPIC
Project Planner	W. G. A. Shaw, B.A., M.A.
Planning Technicians	T. Lindhout F. Wong
Stenographer	J. Jensen

* This report was submitted to the Environment Conservation Authority but not presented at the public hearings at that time as it was a confidential document. The Authority requested that permission be given to include the report in it's study of the Red Deer Hearings. This permission was granted by letter dated February 18, 1972 from the Red Deer Regional Planning Commission, indicating that the Council of the County of Paintearth had no objections to making the report a public document.

LETTER OF TRANSMITTAL

December, 1971

Reeve C. H. Thornton, and
Members of County Council,
County of Paintearth #18,
Castor, Alberta.

Gentlemen:

We are pleased to submit this study of land use problems in the northwest corner of the County of Paintearth #18. The study was prepared upon the request of Council, who in April, 1971 asked this office "to conduct a full study into the strip mining operation on the Battle River north of Halkirk."

It is suggested that Council examine the report and then discuss with members of this office and other involved parties the ramifications of the study. The present on-going hearings being conducted by the Environment Conservation Authority into strip mining activity within the Province of Alberta has affected the nature of this report, forcing it to be an interim examination, but it still provides Council with a base for discussion and a source for recommended action.

Robert R. Cundy, MTPIC
Director

PREFACE

In the spring of 1971 the Council of the County of Paintearth #18 asked the professional staff of the Red Deer Regional Planning Commission to examine the problems related to strip mining in the northwest corner of that County. In undertaking the study it was realized that its scope could be broadened to include the related agricultural and recreational land uses in the area, although it soon became apparent that where land use conflicts and problems existed they involved mining and farming. Therefore, the report contains more than originally intended but concentrates on the aspects which were initially asked for.

The report, however, is of an interim nature since the Provincial Government is currently in the process of re-examining surface mining and reclamation legislation. Nonetheless, it is hoped that the report parallels the thoughts and desires of the County Council while at the same time considering the requirements and restrictions of the mining companies in the study area.

Following changes to the Provincial Surface Reclamation Act the results, conclusions and recommendations of this report should be re-evaluated in light of the amendments to the Act. Should any action then be deemed necessary, after discussions with provincial authorities and mining company officials, the County Council should proceed with the required action.

A number of people and offices contributed information and ideas to this study. Their help was greatly appreciated and hereby acknowledged:

The Council of the County of Paintearth #18:

C. H. Thornton (Reeve)
E. English
J. E. Holloway
E. Kneeland
R. G. Bunbury
K. Losing
M. Lang

G. Tomilson, Secretary-Treasurer, County of Paintearth, Castor

G. W. High, Agricultural Fieldman, Castor

P. Cormack, D.M.A. Assessor, Hanna

B. Nelson, Regional Plant Industries Supervisor, Red Deer

W. Kowalenko, District Agriculturalist, Coronation

D. Heave, Regional Wildlife Biologist, Red Deer

R. McBride, Resident Mines Manager, Alberta Coal Co.,
Halkirk

M. Summersgill, Operations Manager, Alberta Coal Co.,
Calgary

W. G. Sterling, Vice-President, Canadian Utilities Ltd.,
Edmonton

Energy Resources Conservation Board

Parks Division, Department of Lands and Forests

Department of Mines and Minerals

Surface Reclamation Council

W. G. A. Shaw
Project Planner

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*NOTE: Figures and Plates were not included in the report submitted to the Authority.

INTRODUCTION

This report investigates the multiple use of land along the Battle River in the northwest portion of the County of Paintearth. The specific area of study, as shown in Figure 1, includes Township 40, Range 15, West of the 4th Meridian, Township 40, Range 16, West of the 4th Meridian and Township 41, Range 16, West of the 4th Meridian.

The area involved, approximately 51 square miles, represents only a very small segment of the Red Deer Regional Planning Commission area. However, the nature of the inherent problems in multiple land uses, where mineral resources underlay agricultural lands and where both are closely associated with recreation areas, is similar to other portions of the prairie in Alberta. In the future these problems are likely to become more universal, both in the Commission area and Alberta as a whole, as the search, discovery and development of the province's coal resources multiplies with the increasing demand for this mineral fuel.

This study was instigated by the Council of the County of Paintearth who have become increasingly concerned over the loss of arable land to strip mines. Their concern reflects an augmentative awareness of decreasing environmental quality in portions of Alberta and the general desire of the public, government and private firms to protect our resources while at the same time achieving a satisfactory level of provincial economic and industrial development.

Being so stimulated, this report attempts to examine the resources in the study area and the problems which have evolved from their development. In some places the report states feelings often unsubstantiated by background factual material since the required data was either not available or could not be made available because of confidentiality. Therefore, some gaps exist in the study but it is felt that the presented material is sufficient to substantiate the recommendations at the end of the report. It is hoped that these recommendations meet the objectives of the study, which are to examine the various land uses in the area, their conflicts, and means of minimizing in the future further conflicts.

RESOURCES

Topography

The study area is part of the upper steppe of the Canadian prairies, although there is relatively little level land in the area or its immediate surroundings. The land is principally undulating to gently rolling with the prairie level being at an approximate elevation of 2,450 feet (Figure 2). The Battle River, which forms the northern border of the study area, has an approximate elevation of 2,200 feet at this point while Paintearth Creek, which disects the southwest part of the study area is not nearly so entrenched as the Battle River.

Geology[1]

This area was covered entirely during the Keewatin Glaciation period. The ice sheet moved in a general south-westerly direction over the area and in doing so mixed materials it was carrying from the underlying bedrock. Glacial drift was deposited in a mantle of varying thickness over the area and it is this mixed drift which is the parent material of most of the soils in the area. Since the material deposited was mainly of local origin there is a marked similarity between the surface glacial drift and the underlying bedrock.

The uppermost bedrock horizon in the study area is the Edmonton formation. This formation consists largely of sediments deposited under fresh and brackish water conditions with the strata varying greatly both laterally and vertically. The Edmonton formation is composed of fine grained sandstones, highly calcareous sandstones, sandy shale, bentonitic sandstones and shales, bentonite, ironstone bands, carbonaceous shales and coal. Bentonite is the prevailing constituent throughout the whole series of beds. Within the study area the underlying bedrock is very close to the surface and is visible along the Battle River and the various creeks in the area.

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[1] The text of this section was taken from the Soil Survey of Red Deer Sheet and Soil Survey of Sullivan Lake Sheet, both produced by the Dominion Department of Agriculture in association with the Department of Soils or Extension at the University of Alberta.

Climate

With its parent materials originating mainly from the Edmonton Formation, the soils have formed under a continental climate which is characterized by long, bright moderately warm summer days and bright cold winter weather. Precipitation is only moderate. Thus, the soil forming process is relatively slow.

The nearest meteorological station to the study area is at Coronation approximately 32 miles to the southeast. The following table gives the temperature and precipitation records for that station.

TABLE 1

CORONATION TEMPERATURE AND PRECIPITATION

Element [1]	January	July	Year
Mean Daily Temperature	4.9	63.7	36.0
Mean Daily Maximum Temperature	12.9	75.9	46.2
Mean Daily Minimum Temperature	-3.1	51.5	25.8
Maximum Temperature	47	97	100
Minimum Temperature	-48	37	-48
Mean Rainfall (inches)	0.01	2.64	10.26
Mean Snowfall	7.3	0.0	44.3
Mean Total Precipitation	0.74	2.64	14.69

1. Temperatures given in degrees Fahrenheit, precipitation in inches
Source: Temperature and Precipitation Tables for Prairie Provinces. Canada Department of Transport Meteorological Branch, 1967.

In the vicinity of the study area the growing season is around 100 days while annual lake evaporation is approximately 32 inches. Thus, these records substantiate the climate as described above.

Native vegetation in the area is primarily prairie grasses, except along the Battle River where poplar and willow are evident in the shady spots. Where precipitation and evaporation rates allow, grasses are medium to long although sage is present in the drier areas.

Soils [2]

Figure 3 indicates the distribution of soils within the study area. Soils classified as 3d are Killam loam (65%) and Torlea loam (35%) with six to eight inches of topsoil. The heavy subsoil gives poor water penetration and poor drainage. It also restricts root growth and increases difficulty in deep tillage. Depending on the micro-climate suitable crops are cereals and oil seeds or some pasture and hay.

Soils classified as 3md consist of Irma loam (35%) and Irma Fine Sandy loam (65%) with three to nine inches of topsoil of light texture. These soils are well to excessively drained with low holding capacity thus contributing to drought conditions in dry years, although in wet years the yield can be very good. Soil drifting can be a problem. Wheat, oats, barley, rapeseed and forage crops are suitable to these soils.

The Killam loam soils, indicated as 5d, have only three to four inches of topsoil with a heavy subsoil which restricts water penetration and root growth. It is difficult to cultivate. These soils are mainly good for forage crops and pasture although they can produce cereal grains under good management.

The Irma Fine Sandy loam soils, classified as 5m, are very light textured with low water holding capacity. Erosion is a possibility if cultivated. Therefore, only forage crops and pasture are recommended for these soils.

The 5de soils are Torlea loams with three to four inches of topsoil. They also have a hard subsoil which restricts water and root penetration. Crop production is restricted to forage crops.

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2. The information in this section comes from a personal interview with Mr. Bob Nelson, Regional Plant Industries Supervisor, Department of Agriculture, Red Deer on November 1, 1971

The Soil ratings used in this report are taken from the Canada Land Inventory Soil Capability for Agriculture series.

The 6t soils are located on lands which are extensively eroded. Thus, they should be restricted to permanent pasture except where they should not be grazed if there is fear of further erosion.

Soils classed as 7 should not be used for cultivation or native pasture. They are best suited for stands of trees, wildlife and recreation since they are usually on restricted river bottom lands or in coulees.

Coal

The whole of the study area is underlain by coal seams at various depths and of varying thickness and quality. The coal bearing formations extend in all directions from the study area, although the northward extent appears limited while the southern extent may be greatest.

The seams in the study area are very desirable for development since they are close to the surface and thus easily obtained. In addition, the coal is suitable in quality for the readily available market at the Canadian Utilities power plant.

Water

The water in the Battle River must be considered a valuable resource. A dam on the river, around 14 miles north of Halkirk, has impounded sufficient quantities of water for use in the Canadian Utilities power plant for steam generation. The water from the river, streams and ponds is also important for livestock consumption and limited recreation pursuits such as fishing and bird hunting.

Woodland

The extreme northwest portion of the study area consists of wooded slopes and bottomlands of the Battle River Valley. The Provincial Parks Department has taken advantage of the local topography, vegetation and drainage, in conjunction with water and land made available by the Canadian Utilities Company, to establish Big Knife Provincial Park at this point. Some of the vegetation in the area is suitable for limited wildlife habitat.

LAND TENURE

The ownership of land in the study area is shown on Figure 4. The map indicates that the majority of land belongs to numerous individuals while Canadian Utilities Ltd. and Alberta Coal Company Ltd. (Battle River Coal Company Ltd.) form the next largest group of landowners. The Crown, Marathon Realty and Stettler Coal Company have limited holdings. A breakdown of land holdings by area is provided in Table 2.

TABLE 2

LAND TENURE [1]

Title Holder	Total Area Held (Approximate)	Per cent of Study Area (Approximate)
Private Individuals	41.25 square miles	80.8%
Canadian Utilities	4.20	8.2
Alberta Coal Co.	4.90	9.6
Marathon Realty	0.38	0.7
Crown	0.25	0.5
Stettler Coal Co.	0.12	0.2
TOTAL	51.00 square miles	100.0%

1. Compiled from information provided by P.L. Cormack, District Assessor for the County of Paintearth #18 at a meeting held August 31, 1971

LAND USE AND PRODUCTION

The major land uses in the study area are agriculture, recreation and industry. The distribution of these uses is shown on Figure 5.

Agriculture

Extensive agricultural settlement first occurred around Halkirk and Castor with the coming of the railroad between 1908 and 1911, thus making farming the oldest continued activity in the area. It is a mixed farming region since crops are grown and livestock raised. Crops include wheat, oats, barley, rapeseed and hay while cattle graze on various grasses and are fed with various forage.

On the better soils in the area wheat yields for an average year are 18 - 22 bushels per acre while rapeseed yields are 15 - 18 bushels per acre and hay crops 1.25 - 1.50 tons per acre.[3] On marginal grain soils wheat yields are 10 - 14 bushels per acre, rapeseed yields being 9 - 12 bushels per acre and hay yields being one ton per acre. These soils will pasture one head of cattle for every ten acres. Soils which restrict production to forage crops will yield three-quarters to one ton of hay per acre or will support one head for every twelve acres. The strict pasture soils will support one head for every 35 - 40 acres.

Industry

Industrial activity in the study area includes strip mining for coal and the generation of electrical power. Within the study area the strip mines, sometimes referred to as the Cordel mines, are owned and operated by the Alberta Coal Company, although a continuing but old name for the operators is the Battle River Coal Company. The Diplomat mines on the north side of the Battle River, and therefore out of the study area, are operated by Forestburg Collieries. Canadian Utilities Limited owns and operates the power generating plant and the storage dam on the Battle River.

Since some of the earliest settlements in the region there apparently has been localized mining for coal although the Cordel and Diplomat operations which exist today did not commence production until the late 1940's. Both of these operations first mined coal for domestic use and for limited markets in Western Canada.

Canadian Utilities Limited constructed their power generation plant on the south bank of the Battle River during the mid-1950's. The plant, which came into operation in 1956, provided a new market for the local coal mines since the boilers are fired by coal and as the capacity of the plant was increased so did the demand for coal. The original installed capacity of the power plant was 30 megawatts (or 30,000 Kilowatts) but units added in 1964 and 1969 increased the nominal net capacity of the plant by 32 and 150 megawatts respectively such that the present installed capacity is 212 megawatts. Table 3 shows the increase in electric power generation and coal purchases from Forestburg Collieries and Alberta Coal Company.

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[3] The information in this paragraph is from Bob Nelson, November 1, 1971.

TABLE 3

CANADIAN UTILITIES BATTLE RIVER POWER PLANT: POWER GENERATION AND COAL PURCHASES

Year	Net Generation[1] (Megawatts)	Coal Purchases (Tons) Forestburg	Alberta Coal
1959	164,144	77,574	50,677
1960	174,645	85,114	64,336
1961	187,460	90,344	57,167
1962	180,290	89,055	53,138
1963	207,506	102,912	69,561
1964	269,959	140,764	80,715
1965	371,444	191,834	101,333
1966	400,356	202,349	114,686
1967	420,048	228,576	118,866
1968	402,666	219,366	106,103
1969	517,438	332,439	141,174
1970	1,050,205	515,074	268,754

1. Figures are rounded to nearest megawatt.

Source: Letter from W.G. Sterling, Vice-President: Production, Canadian Utilities Limited, Dated August 31, 1971

The present approximate market distribution of the Alberta Coal Company is as follows: Canadian Utilities Limited - 73 per cent, rail shipments to various points in Western Canada - 20 per cent, local domestic use - 7 per cent.[4] Under the Mines and Minerals Act of the

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[4] Personal interview with R. F. McBride, resident manager of the Alberta Coal Company mines on July 14, 1971.

Province of Alberta coal must be supplied to local residents for domestic use upon their request. This segment of the market represents a continually decreasing proportion of the market, although actual tonnages purchased are remaining constant or increasing slightly depending on yearly fluctuations.

In all likelihood, the Canadian Utilities Plant will receive an increasingly greater share of the coal mined by the Alberta Coal Company. The company's 1972 contract stipulates that the plant be supplied with 395,000 tons of coal, which is 50 per cent greater than that supplied in 1970. The long range contract to the year 1983 for the Alberta Coal Co. is to supply the power plant with 50 per cent of its coal requirements.[5]

Since Canadian Utilities Limited will be expanding the capacity of the power plant by 150 megawatts by 1975, mining activity in the area will greatly intensify. This would increase the plant's generating capacity to 362 megawatts which is a 70 per cent addition to its present capacity. There is a possibility that the station could be expanded by two 300 megawatt units at some date after 1975.[6] If these developments occur then coal mining would become very extensive.

Recreation

With regard to the recreational use of the land, Big Knife Provincial Park is used primarily by the inhabitants of the region. Only a small portion of the park's visitors are extra-regional since the park is relatively new, little developed and is located at least sixteen miles from paved highways.

The present environment is suitable for pheasant, partridge and white-tail deer, although the loss of good bush areas (trees with underbrush) to cultivated land has decreased game populations.[7] The reservoir acts as a staging area for ducks while pike, pickeral and suckers are present in the river, although their quantity is limited.

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[5] R. F. McBride, July 14, 1971.

[6] W. G. Sterling, August 31, 1971.

[7] Letter dated August 11, 1971 from D.J. Neave, Regional Wildlife Biologist, Department of Lands and Forests, Red Deer

The existence of the reservoir has enchanced the recreational suitability of the area, both from an aesthetic and active sports point of view.

PROBLEMS OF MIXED LAND USE

It is inevitable in areas of mixed activities or land uses that some problems will arise from the conflicting demands for land, air or water resources among the various uses. This is evident in both urban and rural environments when one use of land is not compatible with adjacent land uses. Usually land uses will have some complementary and non-complementary features but if their conflicting aspects outweigh, either to a small or large extent, the advantages of their juxtaposition then their close association is detrimental to the environment. This is not to say, however, that the two uses or set of uses cannot be made to exist in harmony with each other.

Study Area's Problems

Within the study area the three major land uses - agriculture, industry and recreation, are not compatible with each other in their present form. It already has been mentioned that the conversion of land to mixed farming from its natural state has depleted the number of game animals and birds within the study area just as it has in all the agricultural areas of Alberta. While the problem of the depletion of natural flora and fauna is real, it is only minor in extent and is actually now carefully controlled. However, under modern settlement and demands for land the original state will never again be realized.

More problematic issues arise from the competition between industry and agriculture for land within the study area. While the two resources in the competition for land are different, the coal and power companies requiring coal from subsurface seams and the farmers requiring the surface soils and subsurface soil horizons for crop nutrients, the two resources are superimposed, thus causing conflicts. If the coal was mined by tunneling then the detrimental effects to agricultural lands could arise through land settlement or even cave-ins but these would cause a minimum of problems for farming. However, the present method utilized by the coal company to extract the coal is deleterious to the area's farm lands. This method is strip mining. Figure 6 relates the strip mines and coal leases within the study area to the soil qualities of that region.

Advantages of Strip Mining

Within the bounds of the Alberta Coal Company's operation in the study area strip mining has three important advantages over deep mining or tunneling. These advantages are similar to those in other strip mining areas. Concerning the human aspect, one benefit is that strip mining is far less hazardous to human life since the chance of cave-ins and explosions from ignited gases or coal dust is reduced to practically nil under this method. Strip mining is also less injurious to miners' health since they are not confined to closed spaces where gas fumes and coal dust can be inhaled in concentrated forms.

In regard to economics, a second benefit is derived from strip mining since this method allows a greater percentage of the coal to be mined from the seam than does deep mining. Another economic advantage is that the unit cost of strip mining operations is less than deep mining when the amount of overburden over the coal seam is limited. Generally, strip mining is more economical when there is less than ten feet of overburden for each foot of coal in the seam.[8] However, this varies from place to place depending on the size and type of the mining equipment employed and the nature of the overburden and coal seam.

Within the present confines of the strip mining area the coal seams are six feet thick and lie under an average of 50 feet of overburden.[9] Since it is economical, under the existing operation and market conditions, to mine one foot of coal for the local industrial market for each six feet of overburden and one foot of coal for the local domestic

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8. Personal interview with R. F. McBride, July 14, 1971.

9. R. F. McBride, July 14, 1971.

market for each twelve feet of overburden,[10] strip mining is economically advantageous over deep mining.

Strip Mines and Mining in General

However, for all its economic and humane advantages strip mining does produce considerable detrimental effects to the environment. Through the method of cutting strips of land in order to reach a buried coal seam and piling the overburden in parallel strips onto adjacent land or usually into adjacent cuts, the land is often completely devestated unless considerable planning and care is utilized prior to and during the mining operation. In the distant past blatant neglect by strip mining operators was universal in that plans for oderly stripping and land reclamation procedures were either non-existent or woefully inadequate. Invariably nutritious topsoil was buried under tons of overburden in the spoil piles and natural contours were altered such that drainage was impaired or quickened. This resulted in landscapes which were either partial bogs or eroded slopes, but both were the regrowth of vegetation was impaired. Familiarity with experiences in Great Britain and the Appalachian regions of the United States is proof of this.[11]

In the past thirty years environmental concern has increased, and expecially intensified over the past ten years, such that governments and the public are demanding land reclamation practices by mining firms. In some cases, in fact, it was the companies who led the way to reclamation but more than often the companies who have "really got religion on reclamation now...didn't get religion on reclamation until we (government) put the screws to them."[12] Rarely has reclamation restored the land to its original condition, although from West Germany there are reports of even improving the land,[13] but it is important that the land is reconditioned to serve a useful purpose whether it be immediately economical or not.

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[10] The difference in overburden between industrial and domestic is a result of economies of scale. The Canadian Utility plant purchases so much coal it makes the unit costs decrease with vast increases of output.

[11] R. F. McBride, July 14, 1971.

[12] W. E. Guckert, head of the State of Pennsylvania reclamation enforcement program, quoted in "Taming the Strip-mine Monster" Life, September 1971, p. 21.

Resultant Concerns in the Study Area

Not unlike other plains regions in Alberta and North America where strip mining has taken place, productive agricultural land in the study area has been greatly altered. In many instances the topsoil has been buried under the spoil piles or mixed with the sterile overburden such that revegetation in places has been rendered impossible. Furthermore, the elevation difference between the peaks and hollows can be as much as 20 to 25 feet and the slopes between them being as great as 45 degrees.[14] In the hollows lie ponded water, often heavily sedimented with earth materials from the eroded slopes while the slopes and crests of the ridges support a varying mixture of grasses, weeds or no vegetation whatsoever. Plate 1 visually displays the results. There are inherent problems in properly reclaiming land in this area but these will be dealt with in a later section of the report.

As a consequence of past and present mining activities and the resultant landscape, two important concerns are evident. One is that productive agricultural land is being lost seemingly for a long period of time because the present state of reclamation does not allow the re-use of land. A second concern results from this, it being the potential loss of assessment to the County. With the stripped land being essentially non-productive should the mining company decide to leave the area or appeal their assessment, which presently runs around $10 - 11 per acre as it was for agriculture use before stripping, then much of this assessment would be lost. However, it is felt that the loss of productive land is far more serious than any loss in assessment.[15]

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13. J.D. Ratcliff, "Miracle in German's Heartland", Readers Digest, April, 1971, pp. 86-92

14. Personal estimations by the author

15. Telephone conversation with G. Tomilson, Secretary-Treasurer, County of Paintearth, for which he estimated figures, November 5, 1971. However it seems to be the policy of the Alberta Coal Co. not to appeal assessment on stripped lands - M. Summersgill, Operations Manager, telephone conversation, November 23, 1971.

A third concern is derived from future prospects. At the present 212 megawatt capacity of the Canadian Utilities power plant, the Alberta Coal Company needs to strip 50 acres of land a year to fill the market demands of the plant while Forestburg Collieries requires somewhat more.[16] For simplicity it is assumed that at present demands 100 new acres of land, north and south of the river, are stripped each year. When the plant's capacity is increased by another 150 megawatts in 1975 an additional 70 acres will be required per annum. Should the two 300 megawatt units eventually be installed, thus making the total plant capacity 962 megawatts, then an additional 280 acres of land would need to be mined yearly. Thus, at 962 megawatt capacity, annual mined acres would be 450 acres or approximately two-thirds of a section per year.[17] Assuming that the Alberta Coal Company supplies half of the required coal, then land stripped in the study area would amount to 225 acres per year.

Coal reserves indicate that mining is possible for many years to come. "Proven coal reserves near the Battle River power station can be reasonably placed at about 100 million tons, of which 60 - 70 million tons lie on property now owned by Forestburg Collieries. The remainder is assigned to the Halkirk area. However, Canadian Utilities Ltd. is current undertaking some further exploration which will undoubtedly result in significant upward revision of total reserves in the vicinity of the plant".[18]

Therefore, it appears that not only will strip mining continue but its intensity will increase. To compound the problems, if strip mining is to spread it must do so onto good agricultural soils. Figure 5 shows that to date the mines have been restricted to zones of poorer soils, those rated as 5, 6 or 7, but that recently they have encroached onto number 3 soils. Future expansion, which will likely be south and west, will mean that number 3 soils will be disturbed, and "these are

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16. R. F. McBride, July 14, 1971.

17. This assumes that strip mining would continue to be economically advantageous and technologically possible.

18. Letter from N. Berkowitz, Head of the Coal Research Division of the Research Council of Alberta, dated September 3, 1971.

some of the best soils in the County."[19] Plate 2 shows some of the land that will be affected.

RECLAMATION AND ECONOMICS

Each area which is strip mined has its own peculiar problems for reclamation. These variations in problems result from differences in climate and weather conditions, topography, vegetation and the nature and composition of the soils and overburden. Often, reclamation problems even vary within a single strip mining zone, which consequently tends to complicate stripping and reclamation procedures.

Problems in the Study Area

Within the study area there are three separate strip mines as shown on Figure 5. The center and eastern mines had shale or sandstone overburden with little or no glacial till or soil on the surface. These areas therefore were suitable only for pasture prior to stripping, but after mining the area only shale or sandstone spoil piles are evident.

The western strip mine, however, is different and in all likelihold is indicative of future zones to be stripped to the west and south. Here there is good topsoil and much glacial till, thus being an area suitable for grain crops and rapeseed. Sedimentary and bentonitic clays do tend to make the sub-horizons impervious to water and roots however. The problem in stripping the land is to save the topsoil from burial under or mixture with sterile portions of the overburden.

The bentonitic clays are also problematic in both mining and reclamation. Where the clays are present excavation becomes more dangerous because of the tendency of the walls to slump or cave-in since bentonite tends to absorb water, expand and become 'slippery'. In reclamation the bentonitic clays are problematic in that their sediments fill the pores of the soils and upon getting damp and expanding they seal the soil, thus restricting water and air from passing through. It is important therefore to utilize reclamation methods which restricts the horizons containing bentonite to the lower levels of the spoil piles.

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[19] Personal interview with W. Kowalenko, District Agriculturalist in Coronation, October 29, 1971.

With the Canadian Utilities reservoir in the valley floor below the strip mines it is extremely important that streams of water laden with sediment do not escape from the mines into the reservoir. Not only would the sediments tend, over a long period of time, to fill the reservoir but the water, containing suspended particles of dirt, would impair the boilers in the generation plant when the water is used to make steam. Thus, settling ponds are required in the strip mines such that water is allowed only to filter down to the reservoir.

The depth of the coal seams, sometimes as much as 80 feet,[20] also complicates reclamation (Plate3). The deep cuts increases the amount of overburden and consequently the height of the spoil piles, which further tends to exaggerate slopes and elevation differences between the crests and hollows of the spoil piles. These problems are not as evident in the mining area on the north side of the river where the coal seams are much shallower.

Other problems result from the local semi-arid climate. Being a relatively dry area the soil forming processes are slow and rapid plant growth is hindered. With slow plant growth slopes are harder to vegetate and thus stabilize. When it rains, heavily at times, erosion tendencies are therefore increased. Also, if the spoil piles are levelled there is a tendency for the soil to compact and with the bentonitic clays possibly sealing the soils the chances of sheet erosion occurring increases.

Reclamation to Date

In the past the coal mining operations have purchased productive agricultural land, which was used for either crop or pasture, and then stripped the soil and overburden to reach the coal seam by methods employing insufficient thought, planning and practice to make land reclamation an easier and less costly process. As stated before but repeated here, the resultant landscape is one comprised of parallel ridges of spoil piles which support patchy growths of weeds, grasses and some trees on their excessive slopes and levelled tops and often with heavily sedimented ponds impounded between the ridges. The limited levelling, or topping-off, of spoil piles and the planting of various grass seeds has been only experimental to date although it has produced some satisfactory results in a few places. These are areas where the good soil has been placed on top and along some sides of the spoil ridges and where grasses had a chance to take root before erosion by water swept the seeds and soil into the hollows. Often however, where good stands of grass are present they are on slopes which are steep, unstable and often boggy near the ponded gulleys. Generally, therefore, this land cannot be reutilized even for pasture since it would support a limited number of cattle per quarter section and because of the risk of losing cattle it is likely that no one would rent the land to graze cattle.

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[20] R. F. McBride, July 14, 1971.

A recent action by the Alberta Coal Company has resulted in 50 to 60 acres of spoil piles being levelled into undulating land. As compared to the 20 to 25 feet elevational difference in the ridge and gulley system described in the previous paragraph, the difference in relief in this recently levelled area is only five to eight feet.[21] However, this area contained old spoil piles where little soil was preserved and thus not available for spreading over the top of the undulating surface. Consequently it is likely that vegetation will have great difficulty in establishing itself here. Plate 4 reveals the recent results of levelling.

Economics: A Simplified Introductory Examination

From past experiences in other parts of North America and the world, it is evident that the net returns on reclamation is less than what the money used for reclamation could earn from other investments.

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[21] Personal estimates.

It is obvious that reclamation adds to the per unit cost of producing marketable coal, and the higher the reclamation standards the higher the costs. However it is also obvious that if stripped land is not reclaimed then no benefits, or very few, will ever be derived from that land whether these benefits be social, economic or physical. For example, land which is reclaimed may be leased for pasture, cultivation or whatever, and the money thereby derived can help pay for maintenance and taxes on the land. Reclaimed land can be physically useful as a watershed or for recreational purposes. It can also be socially useful because it improves the aesthetics of man's environment. But derelict land as a consequence of non-reclaimed strip mining operations offers very little - perhaps only a reminder on how not to treat the environment.

A comprehensive and accurate benefit-cost analysis on the financial merits and demerits of reclamation in any strip mining area would involve a long and arduous process of examination of every physical and social factor which affects or is affected by the strip mining operation. It would be no different for the study area in question. However, such an examination is beyond the scope of this study, partly because of the lack of information and technical expertise to undertake such an analysis and partially because a more general examination is in order at this time.

In the ensuing discussion the costs of production, the income of production and the profits of the operation of the strip mines are omitted, primarily because of the complexity of the lengthy and necessary data if these subjects were to be discussed. What will be discussed are the comparative advantages and disadvantages of having the power plant and strip mines within the County and the relative merits and demerits of derelict land as a result of strip mining.

As shown in Table 4 the assessment on the power plant represents ten percent of the County's total tax base. Since little of the revenue coming from the plant to the County needs to be spent indirectly on the power complex (road improvements, snow clearance, etc.) it is a decided economic advantage to have the Canadian Utilities plant located within the County. Not only does it contribute to the tax base, however, but it also stimulates other and increased economic activities such as mining. The men employed at the plant and the mines live and shop within the immediate area and therefore aid the economy of the region. This 'multiplier effect' goes even farther since the money earned at the operations or contributed to the County through assessment is continually respent and thereby indirectly encourage service industries (education, professional offices, etc.) to locate in the area.

TABLE 4

COUNTY OF PAINTEARTH #18 ASSESSMENT

Classification	Sub-Total	Total	Per Cent
Land		$ 7,042,520	44.9
Improvements:		2,694,910	17.2
Canadian Utilities (plant)	$ 1,671,170		(10.7)
Oilfields	670,840		(4.3)
Other	352,900		(2.2)
Power		4,347,400	27.6
Pipe		1,597,230	10.2
TOTAL		$15,682,060	100.0

Source: P. L. Cormack, District Assessor for the County of Paintearth, in a letter dated July 9, 1971

While the Canadian Utilities power complex brings direct economic benefits to the County, it also stimulates some non beneficial results through its associated activities. The associated strip mines, as described in previous sections of this report, have rendered formerly productive agriculture land either worthless or basically unproductive although it is realized that the highest economic use of the land over a short period of time is to mine the coal. For example,[22] on the average one acre of land yields 8,000 tons of coal to the Alberta Coal Company and at $1.55 per ton to Canadian Utilities Ltd. the coal harvest from an acre is worth $12,400. In comparison, the best soils in the area could produce only 15 - 18 bushels of rapeseed per year, which at a price of $2.20 per bushel yields a gross income of only $33 an acre.[23] At that rate of income it would take approximately 375 years of agricultural production to equal the gross income from the coal for one acre. It is therefore easy to see that mining is immediately advantageous economically.

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[22] Figures supplied by R. F. McBride during a personal interview of July 14, 1971 and a telephone conversation on November 9, 1971.

The mining operation is also economically advantageous and socially stimulating because it creates more jobs per unit of land than does farming. For example, including the miners, truckers, and employees at the tipple, the Alberta Coal Company employs 38 full time employees and a total of 54 men during the winter months. At 50 acres of stripped land per year there is the equivalent of one full time job created for each 1.1 acre. On the other hand, an economical one-man farm unit around the study area would be one to one and a half sections which with part time help during harvest averages approximately only one job for 640 to 700 acres.

However, after the initial great income from mining, strip mines which are not reclaimed tend to be economically and socially disadvantageous. They are socially objectionable because they degenerate the aesthetics and hinder the functioning of the environment. Expressed bluntly, unreclaimed or inadequately reclaimed strip mines are visually ugly, environmentally impractical and possibly psychologically depressing. Furthermore, they hinder the long-term economy when they cannot be reutilized since unreclaimed land is waste land which produces no continuous income. It also seems that insufficiently reclaimed land is an economic detriment to a mining company since they must continue to pay taxes on the land although they do not get a continuous income off the land. The company may build a certain percentage into the price of coal to cover the long-term taxes on the unproductive land, thus making the consumer pay extra to compensate non-reclamation, but if this is done then all concerned parties are hurt as the efficiency of the local, provincial and even national economy is being impaired.

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[23] Figures supplied by B. Nelson, November 1, 1971.

To further the argument for the reclamation of land a simplified analysis of the basic economic costs and benefits of reclaimed and non-reclaimed land is in order. This analysis uses assumed data, but the data reflects realistic information quoted by various sources.[24]

In this analysis, which covers a 100 year study period, 50 acres of land has been bought to provide a year's supply of coal in order that the coal mining company can fill its market demands. The analysis commences after the coal has been sold so land and mining costs are disregarded, although it is assumed that different mining methods would be used if the land was to be reclaimed from those methods were reclamation was not intended. Another assumption is that an average of 8,000 tons of coal can be taken from each acre and sold to a buyer for $1.55 a ton. In addition, the County's mill rate is assumed to remain constant at 60 mills for the duration of the study period.

The land which was bought and mined is assumed to consist of number 3 soils, upon which crops were previously grown, and was assessed at $15 per acre. If reclamation was not immediately intended it is assumed that the company did little planning in this regard and therefore the resultant land was practically economically worthless and assessed at only $2 per acre. However, after 50 years the company decides to reclaim the land, but since little forethought was given to reclamation during the original stripping operation it costs the company $600 an acre to level the land and to spread some soil over the surface. This action yields a soil and land quality of number 5 which is good for pasture and the land subsequently reassessed at $10 per acre. Under good management this land during grazing season can carry one head of cattle for each ten acres, producing a 500 pound calf at 30 cents a pound for an income of $15 per acre. Using this data, the resulting accumulated net income on the land is shown as Curve A in Figure 7. (Accumulated net income = income from coal - reclamation costs + net income where net income = gross income from farm produce - taxes on land.)

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[24] These sources include R. F. McBride, P. L. Cormack and B. Nelson who are quoated in similar contexts throughout the report.

Curve B reveals the accumulated net income if reclamation was planned and immediately carried out assuming the following data. Since the company intended to reclaim the land they preplanned their stripping operation such that the cost of stockpiling the soil, levelling the spoil piles and respreading the topsoil would be minimized at $600 per acre. The land however, is reclaimed to nearly its original condition and therefore its assessment remains at $15 per acre and its wheat yields are 20 bushels per acre, which at $1.40 per bushel yields an income of $28 per acre.

Although the number of factors considered in the analysis are minimal, Figure 7 clearly shows that immediate reclamation seems to be economically advantageous over delayed reclamation.[25] Accumulated net income employing immediate reclamation was worth $100,000 more over 100 years, or an additional $1,000 per year being generated into the regional economy. Although the monetary gains seem small it is significant when one considers that land is being utilized and that the economy and environment are consequently functioning more efficiently.

Even the coal company would gain profits through immediate reclamation. Utilizing the assumed data from the previous analysis, and further assuming that the coal company could cash rent their reclaimed land for 20 per cent of the income from the land, Figure 8 shows the different profit structures from immediately and delayed reclaimed land. Had the land never been reclaimed the accumulated taxes over 100 years would be $600, which could be considered a deficit in the company's financial statement. However, after 50 years of letting the land lie in waste and then restoring the land so it is useful for pasture, over the next 50 years $5,700 profit could be realized from cash rental (Curve A). Had reclamation been immediate so the land was restored to its original crop growing capacity the company could gain $23,500 profit in 100 years, or $235 a year (Curve B). Again this sum seems to be paltry but at least it does not contribute toward economic and environmental inefficiency.

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25. Economically advantageous in this report means that income is greater than expenditures, and it discounts that money spent on reclamation for example, may return greater funds had the money been invested elsewhere.

In partial conclusion, it consequently appears that immediate, high standard reclamation is advantageous over non-reclamation or delayed reclamation. Not only does it appear beneficial from an economic point of view but it also appears to be socially and environmentally expedient.

LEGISLATION

Confing the discussion to the regulation of coal mines with respect to their operation and to watershed protection, pollution prevention and land restoration there are a number of acts and regulations which apply to this subject. These include:

The Coal Mines Regulation Act
The Public Lands Act
The Mineral Surface Lease Regulations
The Forest Protection Regulations
The Public Health Act
The Right of Entry Arbitration Act
The Fisheries Act (Federal)
The Planning Act
The Surface Reclamation Act

Of direct interest to the reclamation of land and the authority to require reclamation are two of the above - The Planning Act and The Surface Reclamation Act.

The Surface Reclamation Act

Enacted in 1963 and amended in 1967, the Surface Reclamation Act was passed to provide the provincial government with legislative power to control surface reclamation within the surveyed lands of Alberta with the exception of those in constituted forest reserves. This act set up a Surface Reclamation Council with the Deputy Minister of Mines and Minerals as Chairman and other members appointed by Order-in-Council and by local authorities, whose appointed members could only deal within reclamation cases involving land within the municipality for which the local member was appointed. The Council is empowered to hold enquiries from time to time as it sees fit and to enter mining sites, etc. for inspection.

Should they feel that measures should be taken to properly condition, maintain or reclaim the land surface they can issue an order which directs the performance of any action which in the opinion of the Council would help to:

(1) condition, maintain or reclaim the land,
(2) destroy or prevent the growth of noxious weeds or weed seeds,
(3) remove or remedy any hazard to livestock or the conduct of farming operations, and
(4) install or repair any fence, gate, cattle guard, culvert or other thing.

The order is directed to the operator of the industrial activity, or their designated sub-contractor, who must carry out the ordered work to the satisfaction of the Reclamation Council. When satisfied that the reclamation is completed to the required final standard then the Council must issue a Reclamation Certificate. However, if the operator does not comply with the order then the chairman of the Council can hire another party to undertake the work whose expenses will be paid from the province's general revenue by the Provincial Treasurer, but who in turn can invoice the operator who was originally ordered to do the work. A system of appeals is also constituted within the Act.

Although the Surface Reclamation Act has good intentions, an examination of the Act reveals that it has basic inadequacies when compared to more advanced acts in certain States in the United States.[26] Since the Act is administered by the Department of Mines and Minerals and the Reclamation Council is chaired by the Deputy Minister of that department, the Act and its regulation has a bias toward non-renewable resource activity, even though it is intended for the conservation of renewable resources. Thus, a basic conflict of interests is promoted by the Act. Also, the Act cannot be applied to all lands within Alberta, thereby increasing the chances of inconsistent reclamation regulations within the province. Furthermore, the Act does not stipulate any definite reclamation procedures, nor is a performance bond required to

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26. This paragraph echoes similar thoughts expressed by the Alberta Land Preservation Society in "Coal Mining Damage in Alberta", a brief presented to the Government of Alberta, April, 1969.

be posted by the operator to guanratee their sincerity toward adequate reclamation. In addition, the operators are not required to replan their reclamation procedures prior to stripping the land which contributes to eventual inefficiency in proper reclamation. The Act does not restrict the composition of the Reclamation Council to that primarily of men who have professional and technical qualifications related to the subject, which thereby could hinder the quality of the Council and consequently, perhaps, the quality of its advice and decisions.

The Planning Act

Passed in 1963 and revised in 1970, the Planning Act contains legislation which allows a municipality to control the excavation of land within its boundaries. In its purpose "to provide means whereby plans and related measures may be prepared and adopted to achieve the orderly and economical development of land within the Province"[27] the Act allows a municipality to pass a zoning by-law in order "to regulate the use and development of land."[28] Among other things, the Act prescribes that "a zoning by-law may contain provisions for the purpose of regulating... and excavation or filling in of land or the removal of topsoil from land or the prohibition thereof and the removal of trees and shrubs from any land or the prohibition thereof."[29] When these aforementioned actions are defined as 'development' within a zoning by-law, the party which desires to escavate or remove soil and vegetation must apply for a development permit to the municipal authorities who may, under a legally constituted by-law, control such actions as they reasonably see fit, when, and if, the development permit is issued. If issued, the developer should comply with the stated conditions or else he is guilty of an offence and liable on summary conviction through action taken by the municipality. Thus, although a municipality does not have the authority to directly control the mining of minerals it can have the power to regulate the method by which the mineral is reached . However, to date these powers have been seldom used in Alberta, perhaps with the exception of the excavation for sand and gravel.

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[27] The Planning Act, Section 3.

[28] The Planning Act, Section 119.

[29] The Planning Act, Section 120(15) and 120(16).

Sample By-laws

In researching this study copies of by-laws were requested and received from certain municipalities in the United States which had enacted mining controls within their zoning ordinance. Copies were received directly from the City of Scranton[30] and the County of Luzerne[31], both in Pennsylvania, and indirectly from Stark County, Ohio.[32] The relevant sections of these ordinances are included in the appendix. These by-laws state regulations for:

(1) the method of application for stip mining permits
(2) the location of strip mines
(3) the extent of excavation within a parcel
(4) maximum site size a permit may be applied for
(5) time of operations
(6) blasting
(7) location of processing equipment
(8) posting of bonds
(9) insurance for personal injury
(10) plans of stripping operations
(11) reclamation and reclamation requirements.

It is felt that a municipality within Alberta could insert many of these provisions within their zoning by-law under the present framework of The Planning Act.

ATTITUDES

Within today's North American society there is a general concern about the quality of the environment. Man's interest has multiplied with

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30. City of Scranton, Zoning Ordinance, pp. 41-42, Mimeographed copy, City Planning Commission, Scranton, Pennsylvania.

31. Luzerne County Zoning Ordinance, Luzerne County Planning Commission, Wilkes-Barre, Pennsylvania.

32. "Township Zoning Provisions for Strip Mining", Stark County Regional Planning Commission, received from the American Society of Planning Officials, Chicago, on May 25, 1971.

his rising awareness of some of the environment's rapidly deteriorating properties and, true to man's nature, as he becomes increasingly affected by these changes he decides that the problems should be resolved. It is safe to assume that the concern about Alberta's environment, including its air, land and water, is at least a partial consequence of increasing and spreading environmental awareness, and, in part, the disquietude over mining and drilling in Alberta is a further consequence of this. However, poor industrial practices in the past history of this province have been a primary catalyst for the conservation movement in Alberta.

Restricting comments to only the study area, a number of bodies hold opinions on the mining activity in the vicinity of the Battle River. These are discussed in abbreviated form in the following paragraphs. At this point it should be noted that the prevailing attitude, usually dominated by the public, is that land should be reconditioned to serve a useful purpose, whether it be immediately economical or not.

County of Paintearth: Council

The Council of the County of Paintearth realize that it is economically advantageous to have the power plant and strip mines within their municipality, but in their rural orientation they also fear the loss forever of good arable land. While they are somewhat concerned that the land stripped over the last 25 years has not been adequately reclaimed for re-utilization, their concerns for these past workings are minimal since they are cognizant of the fact that much of that land was of marginal agricultural utility. However, since the mining zone is now encroaching onto some of the County's best soils and will further spread into it, the Council is greatly worried about the inadequate reclamation of these future stripped areas. Thus, while they appreciate all attempts to restore the older stripped areas they are more desirous that future stripping operations be pre-planned such that reclamation is speedier and more economical so the land can be used again productively as quickly as possible.

Provincial Government

With the passing of the Surface Reclamation Act in 1963 the provincial government indicated its concern for the reclamation and re-use of lands affected by strip mines within the province. Prior to its defeat during the summer of 1971 the Social Credit government was studying, through the Conservation and Utilization Committee, the need to improve the Act. Since its election to power, the Progressive Conservative government with its newly established Department of the Environment under Minister Bill Yurko is continuing and elaborating upon these studies. In fact it has been announced that the Environment Conservation Authority will conduct hearings into the impact of resource development on the environment,[33] first concentrating upon the effects of strip mining.[34] It was even suggested that new legislation on reclamation, thus indicating more rigid controls, will be introduced at the next session of the Legislature for discussion and approval.

Surface Reclamation Council

As an arm of the Provincial Government, the Surface Reclamation Council reflects the attitudes of the government. However, as the body which inspects mining activity and reclamation procedures it is important to note that the Council is satisfied with the process and extent of reclamation in the study area. From time to time, after site inspections, it has suggested means of advancing reclamation but it would appear that the necessity for suggestions has been limited in the opinion of the Council.

Alberta Coal Company

As the major mining operator in the study area the Alberta Coal Company, with their awareness of public interest, are themselves concerned about the reclamation of land.[35] They are aware that unreclaimed land is economically detrimental to them but they are equally conscious of the fact that the cost to reclaim land in the study area is greater than its selling value. Consequently they feel that they will reclaim the land by their best known methods, with the approval of the Surface Reclamation Council and aid of agricultural fieldmen, although often experimenting, such that land which can be restored to pasture land quality will be done so over a period of approximately five years. Land not suitable for reclamation to pasture will eventually be landscaped and revegetated for use as game habitats or fish ponds. Should new legislation require land to be restored to its original condition it appears that the company would do it, but consequently that the cost of coal would increase and as a result the eventual consumer would pay for the added costs of reclamation.

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[33] "Hearings Ordered on Conservation", Red Deer Advocate, November 10, 1971.

[34] "Yurko Orders Speed in Strip-mine Probe", Red Deer Advocate, November 17, 1971.

[35] The subject matter in this paragraph comes from a telephone conversation on November 23, 1971 with M. Summersgill, Operations Manager for Alberta Coal Company in their Calgary office.

SUMMARY AND CONCLUSIONS

It is now in order to summarize the major findings and thoughts which were presented in the previous sections of the report. This summary is followed by the conclusions which result from the study.

Summary

The area under investigation, being the extreme northwest corner of the County of Paintearth, consists of gently rolling to undulating prairie which is bordered on the north by the entrenched Battle River and dissected in the south by Paintearth Creek. The relatively dry climate, which has considerable diurnal and annual temperature extremes, is not conducive to the rapid growth of vegetation on soils which range in rated quality from number 3 through 7. Consequently, agricultural yields are relatively low when compared to other areas in southern Alberta, although farming is a viable activity in the area.

Shallow coal seams underlay the whole area while the wooded slopes and bottom lands of the river provide some of the better recreation spots in the region. Thus, agriculture, strip mining for coal and recreation are major land uses. The availability of inexpensive coal and water from the Battle River gave birth to a new industry, electric power generation, when Alberta's power demands warranted the construction of the Canadian Utilities power plant during the mid 1950's. As a result of the mixed interests in the area, land tenure is divided between private individuals, companies and the Crown.

With the existence of a mixture of land uses, problems due to conflicting resource demands have arisen. Some problems are not as serious as others and in one instance one use aids another. Basically, conflicts between recreation and the other land uses are minimal since Big Knife Provincial Park is situated on lands comprised of excessive slopes and bottom-lands of limited agricultural utility. Furthermore, the mines have little direct affect on the Park although they do depreciate the aesthetic qualities around it and have damaged some coulees which could function as good game habitats. However, these coulees could be restored reasonably easily, although not necessarily inexpensively, for use as game habitats and fish ponds. It is important to note that the existence of industry has in ways aided the recreation values of the area since the reservoir has increased the recreation capabilities of this section of the Battle River Valley.

To date, agriculture and mining activities have not existed without real conflict although this does not mean that they cannot co-exist in harmony. Problems are presently evident since the stripped lands have not been reclaimed to a standard which is sufficient for re-utilization, whether it be for recreation or agricultural purposes. Experimental work and methods have been tried during the recent history of the mining operations to promote the advancement of good reclamation practices in the future, and these attempts have been suitable to the Surface Reclamation Council. Some recent work in the area has resulted in some old spoil piles being bulldozed into 'rolling contours' while attempts to revegetate the levelled land will come soon. However, as described earlier, much of the stripped area still consists of parallel ridges of spoil piles and gullies between them. Vegetation has taken in places but excessive slopes and water hollows are not conducive for the land to be used for pasture. Additional work in these areas could make them re-usable.

It is known that strip mining is the most economical and least hazardous method of mining for coal in this area, although without adequate concern and preventive action it is also the most harmful to the environment. While there are numerous authentic problems which impede reclamation it is generally recognized that without reclamation productive farmland is being lost and there is a potential loss of assessment to the municipality. A greater fear is that mining activity will intensify in the future and subsequently spread more rapidly onto the surrounding good arable soils. It is therefore felt that now is the time to make sure that adequate reclamation controls are available to insure that stripped land is reclaimed to a high standard.

At the present time a number of Provincial acts and regulations have some relationship to surface reclamation, the most direct being the Surface Reclamation Act. This Act at present has basic inefficiencies in the theory of reclamation control but the present Provincial Government seems to be taking steps to rectify this. The Planning Act can be used by a municipality to control the modification of land surfaces.

Concerning attitudes on reclamation it can be said that all parties, including the Provincial Government, County Government, coal companies and the public, are interested in good reclamation being achieved. Of course, some are more interested in immediate reaction and sophisticated practices no matter what the cost while others desire planned advances at minimized costs. It seems important to obtain a sound and beneficial medium between these two poles.

Conclusions

Although the location of the Canadian Utilities power generating station within the County of Paintearth is undoubtedly economically advantageous for the municipality, it has stimulated more intensive strip mining activity within the immediate environs of the power plant. In turn, the intensification of strip mining is causing concern, and rightly so, about the loss of productive land and the deterioration of the environment. This concern is justified because reclamation of stripped lands in this area in the past has proved to be inadequate since none of the worked land has been restored to a standard capable of allowing the re-use of the land for neither agricultural nor recreational purposes.

This conclusion is not an admission that strip mining should be halted or even detered. It is realized that strip mining within the study area has too many advantages, including health, safety and economic benefits, over the alternate method of deep mining. It is further realized that where strip mining occurs in agricultural areas conflicts are bound to arise although through adequate planning and action the number and seriousness of these conflicts could be minimized such that strip mining and farming could exist in harmony. Their harmonious co-existence could occur at the same time over an area of land and over a period of time on the same piece of land. This depends, however, on the quality and type of strip mining techniques and reclamation standards. In the study area to date, neither of these has been sufficient to conclude that a real conflict does not exist, although advances in the past few years indicate that without too much additional effort the two activities could exist harmoniously in time and space.

It is gratifying to see that reclamation experiments, including tests on various stripping methods, seeding different grasses and planting trees, have been undertaken in the older and newer areas of the strip mines. It is some consolation to know that the Surface Reclamation Council is satisfied with the reclamation work in the area, which indicates that the problems here are minimal when compared to other areas in Alberta, such as the foothills. However, it is disconcerting to see spoil piles support good stands of grasses in places, but because of their excessive slopes and 'bog' hollows cattle cannot safely graze on them. It is more disconcerting to know that the land could be levelled into rolling contours but with the fear that no good soil will remain on the surface to support vegetation.

Nonetheless, it is understood that time and experimentation is required in order to gain knowledge and ability to adequately reclaim land. It is understood that localized problems exist which complicate reclamation procedures, but that this area could be reclaimed more easily than other land surfaces and subsurfaces. Since strip mining in the area will intensify and spread more rapidly into zones of good agricultural soil it is imperative that the results of the past experiments and the knowledge of results from other techniques used in other areas be synthesized into an orderly reclamation plan for the study area such that reclaimed land can be productively reutilized within a reasonable period of time, say within five years. As a comparative example, it is noted that some of the spoil piles which support good, but often patchy, stands of grasses were seeded seven years ago, but to level them now in order to make them usable and to try to re-establish grasses could take another five years. Therefore, as argued previously in the report and concluded here, immediate reclamation is advantageous since it prevents the duplication of work apparently lowers costs and turns land back into production much sooner, thus providing additional social and environmental benefits.

It seems that immediate, high standard reclamation is economically advantageous to the coal mining companies and to society. Money used for reclamation could be invested elsewhere to return greater monetary dividends, but with reclamation over time the environmental and societal benefits, which are very important but almost incalculable, should more than equalize any returns from alternate investments. In other words, reclamation need not require economic justification alone when benefits to society and the environment can more than offset any financial concerns.

Of course, immediate reclamation should be promoted by the use of stripping procedures which would minimize the time and costs to reclaim the land so it could be used within a five year period. The procedures should be designed and adhered to in order to create a pattern of spoil piles and over-burden distribution which would minimize the amount of work required to grade the worked land into an undulating plain with a preplanned drainage pattern and settling pond area. The upper level of the final surface should consist of the nutricious portions of the soil horizon so problems in reconditioning, seeding and planting are decreased. Thus, it is envisioned that where existing soil quality permits all newly stripped areas should be reclaimed for use as pasture land. If soil quality does not permit this then the stripped land could be reclaimed for recreational purposes by turning the land into game bird sanctuaries, fish ponds, etc. The older strip mine areas could also be converted into similar recreation areas.

It is apparent that costs for reclamation will be borne by the market and not the supplier of the coal. Furthermore, the higher the reclamation standards the greater the operation costs of the supplier and consequently the higher the price for coal. The largest eventual market for the coal in the study area is the people who purchase electrical power from the grid into which the Canadian Utilities plant feeds its produced power. Therefore, numerous people throughout the whole province will individually contribute a small portion toward paying land reclamation costs in the study area. The higher the reclamation standards the greater the portion, but distributed throughout the province the increased price of power to the consumer would be diminutive. Assuming $600 per acre for reclamation costs and 8,000 tons of coal per acre, it would take an additional 7.5 cents per ton of coal to pay for the reclamation of an acre of land. Distributed throughout the province this increased cost seems minimal. Of course, if and when this was done for all strip mining operations in Alberta the accumulated increased cost would be more noticeable. However, it is felt that the social and environmental benefits outweigh the increases in costs and therefore reclamation should be carried out. This parallels the philosophy that if Alberta and Albertans desire development as well as to maintain their environment then they will have to pay for it.

RECOMMENDATIONS

From the research and conclusions of this study it is recommended that stripped land within the study area should be reclaimed more quickly and to a higher standard than what has occurred in the past. It is felt that part of any reclamation enforcement could come from the County with reclamation provisions being inserted into a zoning by-law. However, with the Department of the Environment and the Environment Conservation Authority currently examining the need to rewrite the Surface Reclamation Act it is difficult to recommend specific contents for any zoning by-law provisions. It is felt that the Provincial Government should enforce land reclamation and restoration using provincial wide standards, safeguards and stimulants in order to assure continuity throughout the province. However, if the new regulations are felt to be inadequate by the County then they should not hesitate to pass a zoning by-law which contains sections that will regulate surface reclamation as they see fit.

It is strongly recommended that surface reclamation legislation should include the following and if the provincial act does not contain provisions to include these then the County should have its own regulations contained within a zoning by-law to fill the gaps in the legislation.

(1) That the company pre-plan the final reclaimed landscape such that their stripping methods will enhance reclamation procedures. In this regard a stripping and reclamation plan should be submitted to the authorities for approval before development (stripping) is allowed by permit. It must be realized, however, that some flexibility should be allowed to the company to change plans as conditions warrant.

(2) That a performance bond be posted by the company to insure their desire to reclaim to required standards. The amount of the bond should be determined by the authority and should be equal to 25 to 50 percent of the cost of reclaiming the land.

(3) That reclamation should be to a standard which produces pasture land, where possible, and should include
- stripping, stockpiling of topsoils where necessary
- excavation, hauling of overburden where necessary
- levelling of spoil piles into rolling contours
- spreading and grading of topsoil over surface
- providing drainage channels and settling basins where needed
- fencing off dangerous areas to humans or animals
- clearing and tidying
- treating or reconditioning soil where necessary
- seeding of grasses
- planting of shrubs, trees
- maintaining reclaimed lands

It is felt that all areas of number 5 soils or better should be reclaimed for use as pasture land. Areas where poorer soils exist could be reclaimed for recreation zones. Where possible, land along the escarpment of the Battle River should be left untouched to protect slope stability since alternate areas away from the river banks are available for mining. Where possible major County roads should not be disturbed.

It is strongly suggested that the reclamation authority or authorities work closely with the mining company in finalizing a suitable reclamation plan. It is further suggested that a landscape architect(s) or reclamation experts be employed to insure the validity of the plans. Of course, the company, the Provincial Government and its reclamation body (currently the Surface Reclamation Council) and the County should remain in close contact to discuss and alter reclamation requirements when necessary.

Therefore, it is recommended that the County examine this report and discuss the merits of its conclusions and recommendations. After the results of the hearings are known and the Surface Reclamation Act is re-written, then the Council can discuss the consequences with this office and action can be taken where determined necessary. Also, since similar activities occur north of the Battle River, it is suggested that elected and appointed officials from the County of Flagstaff and the Battle River Regional Planning Commission be included in any future meetings on this subject. This could help to contribute toward common philosophies and practices on reclamation within this sub-region of Alberta.

APPENDIX

Relevant Sections of
City of Scranton - Zoning Ordinance

6.300 STRIP MINING AND EXCAVATION OPERATIONS

6.301 Locations Where Permitted. Strip mining and excavating operations shall not be permitted except when approved as a special Use by the Board in the R-1, M-1 and M-2 Districts. When so approved such strip mining operations shall be conducted only for limited periods of time, as specified below subject to appropriate conditions and safeguards.

6.302 Restrictions. All strip mining and excavation operations shall be subject to the following restrictions:

a. Backfilling. The grading, backfilling and replacement of all overburden material in a manner which will restore the premises to the same or more suitable and useable grade as existed on the original site.

b. Fencing. The Board of Zoning Appeals may require that all or portions of stripping or excavating operations be enclosed with a fence to ensure the general welfare and public safety.

c. Operating Schedule. Strip mining and excavating operations, including drilling and blasting, shall not be carried out on Sunday, and shall not be operated earlier than 7:00 A.M. nor later than 10:00 P.M. during the remainder of the week.

d. Drainage. All such excavations and backfilling operations must be adequately drained to prevent the formation of pools of water.

e. Slopes. The side walls of any excavations which are not completely backfilled shall not have a slope steeper than one foot of vertical distance for each two feet of horizontal distance.

f. Compliance with State Requirements. No permit issued under the provisions of this Ordinance shall become effective until any required license or permit required from the Commonwealth of Pennsylviania be secured.

6.303 Applications for Permits. All applications for Zoning Permits for strip mining or excavation operations shall comply with the Special Use requirements of this Ordinance and with the procedure set forth in Section 7.404.

Relevant Sections of
Luzerne County - Zoning Ordinance

2.05 Excavation of Sand, Gravel, Coal or other Minerals and Rock and Peat Moss, for Sale.

2.051 Excavations of sand, gravel, coal stripping or other minerals, and rock and peat moss shall be considered a temporary use, and new excavations shall be permitted only in Mining, Agricultural, Conservation or Heavy Industrial districts. Deep coal mining shall be permitted in any district. All new excavations of materials listed above shall require the approval of the Board.

2.0511 In the case of coal mining, new excavations shall be defined as those specific limited areas not now operating under a state permit at the time this Ordinance becomes effective. For strip mining, applications shall not exceed ten (10) acres in area, and the Board shall require such measures as will protect the public interests including conformance with the following:

2.05111 Map. Submission of a map which will outline the entire proposed area to be strip mined, said map to contain the surface features showing buildings, dwellings, churches, schools, railroads, highways, and lot lines of public and semi-public uses within a distance of 500 feet from the perimeter of the proposed strip-mining operation. In addition, said map will indicate the approximate or proposed depth of said strip mining operation.

2.05112 Bond and Backfilling. That a bond in the sum of $2,500.00 per acre of land to be excavated, be filed with the Board, to guarantee the complete backfilling of any overburden removed, and to guarantee 50 percent of survival of all trees planted for a years period in connection with the State Law in Anthracite Strip Mining. Backfilling is to restore the land to a useable condition. If, after complete backfilling of all overburden, the land is not approximately level with the unexcavated area, the slopes of the edge of the excavated area shall not be steeper than one foot of vertical distance for each one and one-half feet of horizontal distance. On sloping hillsides, the final grade of the stripped area shall range from seven to fifteen per cent.

2.05113 Insurance. That a certificate of insurance with limits of $100,000.00 per person and $300,000.00 for property damage, be filed with the Board both for the benefit of all persons who might be injured or suffer property damage as a result of said mining operations, and to save the County of Luzerne and its officials harmless from any and all claims, suits or demands caused by the mining operations.

2.05114 Supervision of Blasting. The use of explosives for the purpose of blasting in connection with strip mining shall be done in accordance with regulations promulgated by and under the supervision of a representatative of the Pennsylvania Department of Mines and Mineral Industries.

2.05115 Distance Provisions. The perimeter of any excavation under this section shall not be nearer than 200 feet from any building or road, except that owned by the excavator, or 100 feet from any, or any other, public or semi-public use.

2.05116 Timing. Primary blasting in any excavation shall occur only between the hours of 8:30 A.M. and 4:00 P.M., on either Eastern Standard or Eastern Daylight Time, as the case may be.

2.05117 Location of Processing Equipment. To reduce airborne dust, dirt and noise, all structures for sorting, crushing, grinding, loading, weighing, washing, and other operations shall not be built closer than 300 feet from the right-of-way of any public highway, or 300 feet from the boundary or residential, commercial or light industrial districts.

2.05118 Drainage. All excavations both during operations and after completion shall be adequately drained to prevent the formation of pools of water and reduce the seepage of water into underground mines, both for safety, and to reduce formation of mine acid water polluting the streams and rivers. Prior to any excavation for stripping operations a ditch shall be excavated on the outside of the proposed pit for the purpose of conveying the drainage from the watershed above the stripping pit to the regular creek channels to reduce seepage of surface water into underground mines.

2.05119 Compliance with State Requirements. Permits under the provisions of this Ordinance will not be issued until the required license or permit has been secured from the Department of Mines and Mineral Industries, Commonwealth of Pennsylvania.

4.11 "M-1" - Mining Districts

Uses Permitted Without Board Approval	Bulk Fuel Storage Contractors Yards Railroad Yards Storage of Materials Excavated Tipples Trucking Contractors Yards Utilities Accessory Uses to the Above
Uses Requiring Board Approval	Areas of Deep Coal Mining Extraction and Underground Storage of Gas and Oil Extraction of Peat Moss Excavation of Sand and Gravel Junk Yards Manufacturing Uses Processing of Materials Excavated Quarrying of Rock Storage of Explosives Solid Waste Disposal Areas Strip Mining Accessory Uses to the Above

STARK COUNTY REGIONAL PLANNING COMMISSION
TOWNSHIP ZONING PROVISIONS FOR STRIP MINING

Strip mining for coal or otherminerals, sand, gravel, clay, limestone, or sandstone, may be permitted by conditional use permit in any zone; subject to the following conditions and regulations:

It shall be unlawful for any person, firm or corporation to operate or conduct a strip-mining operation in any section of the unincorporated area of the township, unless specifically approved and authorized in writing by the Township Board of Zoning Appeals.

1) Application for permit -- Application for approval shall be made in the following manner:

    a) A request listing the name and address of the applicant, a description of the location, extent and duration of said operation, the proposed route to be used over public streets and private property in transporting mined materials, plus a map of the boundaries of the area to be affected during the proposed permit year shall be filed with the Zoning Inspector. The area of land affected means the area of land from which earth and other materials are removed, as well as the area upon which said earth and other materials are deposited.

    b) The application, plus a site and surrounding area inspection report from the Zoning Inspector certifying the information contained in the application proposals shall be considered by the Board of Zoning Appeals, at their regular meeting and the public hearing when said proposed permit is considered.

2) Upon approval by the Board of Zoning Appeals, a conditional use permit shall be issued, subject to the following conditions:

    a) Unless written permission has been issued by the public authority charged with the maintenance of a public road, noexcavation or land affected by the strip mining shall extend closer than fifty (50) feet of horizontal distance to any public thoroughfare or highway boundary line, in case recorded ownership is to the centerline of the thoroughfare or highway, the boundary line, for purposes of this Resolution shall be a line parallel to the centerline of said road or highway and a distance therefrom of thirty (30) feet.

b) No excavation shall extend closer to any lot line not abutting a public thoroughfare or highway than thirty (30) feet horizontal distance and one (1) foot additional horizontal distance for every one (1) foot of vertical cut in excess of thirty (30) feet. However, should strip mining operation involve two or more adjacent properties, this provision shall not be applicable to the property line permitted to be crossed by the property owners involved.

c) No excavation shall be permitted so as to endanger the existing water supply of property owner's land adjoining to, or adjacent to, or in the immediate area of such proposed excavation.

d) No blasting shall be permitted so as to be a hazard to property owners' adjoining land used for any and all strip mining operations. No blasting with excessive amounts of explosives shall be permitted when any neighboring resident's dwelling or other property may be damaged by concussions or tremors caused by aforementioned explosives.

In case of disputes of this issue, the Township Trustees, the Zoning Inspector, the Board of Zoning Appeals, and the property owner shall meet to determine if there is damage being caused and, if so, the blasting shall be stopped or reduced to satisfy the above named parties. If it is found that damage has been done by blasting, the operator must satisfy the amount of damage done, as agreed upon by the above named persons, before operator can continue.

BOND REPORT REQUIREMENTS

1) The operator, except those operators who post strip mine reclamation bond with the State of Ohio, Division of Reclamation, and give evidence thereof to the Township Clerk, shall file with the Township Clerk a bond on a form prescribed and furnished by the clerk, payable to the

township and conditioned by the faithful performance of all requirements contained in this section. Such bond shall be signed by the operator as principal and by a surety company authorized to transact business in this state, as surety. (Bond to be furnished before any equipment is moved on the premises.)

2) the bond shall be for the payment of that amount of money which is equal to Two Hundred and Twenty ($220.00) Dollars multiplied by the estimated number of acres of land which will comprise the area of land affected within the period of one year immediately following the posting of said bond for the strip mining operation which said operator proposes to carry on. No such surety bond shall be for the payment of an amount of money less than One Thousand ($1,000.00) Dollars.

3) Liability upon such bond shall be for the duration of the strip mining and reclamation of the area of land affected by such strip mining operation.

4) If, at any time during the permit year, the number of acres of land in the area of land affected by the operation for which a permit is issued exceeds the number of acres stated in the application or any amendment thereto of the land to be affected within the permit year, the operator of such operation shall file with the Zoning Inspector an amendment of said operation, stating the revised estate of acres of land which will be affected, including a description of the proposed area.

   At the time of such filing, the operator shall file, if required a surety bond with the Township Clerk in an amount equal to the amount of Two Hundred and Twenty ($220.00) Dollars multiplied by that number which is equal to the difference between the number of acres of land which will comprise the area of land affected by such operation within such permit year, as stated in the revised estimation and the number of acres of land previously approved for said operator.

5) Within sixty (60) days after the end of a year for which an operator was granted a conditional use permit to engage as the operator of a strip mining operation, or prior to that time if the operation for such a permit was issued has been completed or abandoned before the end of such permit year, the operator shall file a report with the

Zoning Inspector indicating the name and address of the permit holder, a description of the location of said operation plus a map of the area actually affected by said operation. If the report indicates that the area of land affected exceeded the original or revised estimate, the operator shall file with the Township Clerk, if required, a bond in the amount which is equal to the amount of Two Hundred and Twenty ($220.00) Dollars multiplied by that difference between the number of acres of land which comprises the area of land affected during the permit year and that stated in the original and any subsequent amendments during the year.

Upon receipt of this report and a site inspection by the Zoning Inspector, the Zoning Board of Appeals shall charge the area of land affected by the strip mining operation against the bond filed by the operator at a rate of Two Hundred and Twenty ($220.00) Dollars per acre. If the area of land affected during the year is greater than that applied for, the operator shall file with the clerk an additional sufficient bond similarly determined.

If the board determines that the area of land affected during the year is less than estimated, they shall direct the Township Clerk to issue a release of the surplus of the bond upon which liability has not been charged as aforesaid.

6) Prior to the expiration of two years after filing the yearly, completion or abandonment report required herein, showing the area of land affected by the operation covered by such report, the operator filing such report shall reclaim such area of land as hereinafter prescribed. However, during this two year period, should any or all of the land covered in this report be approved for a conditional use permit as a sanitary land fill area, the mining reclamation requirements for that portion approved shall be waived and a proportional part of the bond shall be released to the operator.

   a) At any time in the period of time allowed an operator to reclaim the land which has been affected by strip mining, such operator may notify the Zoning Board of Appeals in writing that he has either: completed all the work of reclaiming such area; that he has completed the work of reclaiming such area, other than planting; that he has completed to work of planting.

b) The member of the board shall, within sixty (60) days of the receipt of such a request, make a site inspection and inform the applicant of the approval or disapproval of such request. If The Board approves such request, they shall certify such performance to the township clerk who shall issue a release of the bond in an amount as described as follows:

    1) An amount equal to the amount of Two Hundred and Twenty ($220.00) Dollars multiplied by the number of acres in such area if all work of reclamation has been completed.
    2) An amount equal to the amount of One Hundred and Seventy $170.00) Dollars multiplied by the number of acres in such area if all work of reclamation other than planting has been completed.
    3) An amount equal to the number of Fifty ($50.00) Dollars multiplied by the number of acres in such area if the work of planting has been completed.

c) If the operator fails or refuses to comply with the requirements of this section, or the time limit is not met, in any respect for which liability has been charged on the bond, the bond shall be forfeited for liability thereon and collection shall be made by the Township Clerk.

RECLAMATION REQUIREMENTS

1) The surface of all spoil banks shall be graded so as to reduce the peaks thereof and reduce the depressions between the peaks of such spoil banks to a surface which shall be a gently rolling topography, which grading shall be done in such a way as will minimize erosion due to rainfall and will also eliminate steep grades between peaks and make the surface more suitable for grazing cattle or forestry activities, and in any such area of which any spoil bank contains isolated peaks, such peaks shall be graded to an approximately level surface, having a width of not less than twenty (20) feet.

2) The mine refuse and other debris on the bottom of the last cut shall also be graded to promote their possible submerging by water or for the purpose of creating a more uniform topography in the bottom of the last cut.

3) The area of land affected by the strip mining operation shall at the termination of said operation and reclamation of said areas, be cleared of buildings, machinery, appurtenant equipment, unused tipples, and the filling in of scale pits.

4) All areas affected by strip mining shall be seeded or reforested at the approval of the Zoning Board of A-peals, to the extent of not more than Fifty ($50.00) Dollars per acre, which will be paid by said operator.

Whosoever shall violate any of the provisions of this section or this Resolution shall be fined not less than Twenty-five ($25.00) Dollars nor more than One Hundred ($100.00) Dollars. Each day of continued violation of any provisions of this section of this Resolution shall be a separate and distinct violation of the same.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

Would you elaborate on the benefits that come to the county through strip mining? What proportion of that tax base is related to the strip mine and what proportion to the power plant?

MR. GUY TOMILSON

The power plant has the largest part and the actual machinery in the plant is a large valuable asset.

DR. WALTER TROST

Does the large equipment the strip mines use form any part of the tax base for the county?

MR. GUY TOMILSON

Not as a tax base. It is a benefit to the county but not a large benefit. The machinery that strips the mine, strips the coal, mines it and produces it, is portable machinery that is licensed; the greatest revenue being $10,000 a year. The Canadian Utilities Plant tax bill is $346,000. The mine tipple and the machinery within the tipple is not a large factor in the overall tax basis either. The biggest part is the electrical plant, particularly since there are plans to double the present capacity.

DR. WALTER TROST

Can you describe the amount of employment and again distribution between the power plant and the strip mining operation?

MR. GUY TOMILSON

The largest employment would be the strip mining operation in this case due to the fact that many of the power plant workers reside in Forestburg and we gain no benefit from taxation from their residences.

DR. WALTER TROST

The county to the south or to the north would then gain from that benefit.

MR. GUY TOMILSON

That is true.

DR. WALTER TROST

In your own judgement and experience do you believe that if one were to start with good farm land and take the coal from underneath could it be restored to good farm land condition?

MR. GUY TOMILSON

I do not believe it will ever be good farm land again. It might make poor pasture land or possibly a native land with wildlife. That is not very productive in the tax field. The production from this particular unit of land for coal is far greater then any agricultural production over a period of many many years but it is a sudden production. You could make poor pasture land but definitely not the high quality plain producing land that it was.

DR. WALTER TROST

There would be some loss then in benefit to the country from the withdrawl of these productive lands. When do you foresee this to be an important detriment to the county?

MR. GUY TOMILSON

The fact is that we lose something. It would take many years before it became a large burden on the tax base.

MR. PAUL BABEY

Comparing the poor pasture land to good productive soil, is there a great difference in assessment?

MR. GUY TOMILSON

A poor pasture land might be assessed at three to four dollars per acre while the present land is in the neighbourhood of fifteen to eighteen dollars per acre.

CITY OF RED DEER

PRESENTED BY MAYOR R. E. BARRETT

5.3 ADDENDUM TO THE BRIEF OF THE RED DEER REGIONAL PLANNING COMMISSION

Presented by: R. E. Barrett.

The city of Red Deer welcomes the opportunity to present its point of view before the Environment Conservation Authority regarding the question of strip mining and other potential works that could affect the Red Deer River. What we have to say is not of great length but is complementary to a report prepared by the Red-Deer Regional Planning Commission of which we are a member.

The City of Red Deer is a growing and healthy community with some 28,000 residents. It is situated in a well developed farming district which contains many recreational attractions of great interest to tourists; an area of our economy that has much development potential.

In 1961, the city constructed an anaerobic lagoon for sewage treatment at a time when this type of lagoon was relatively new. Our experimental lagoon was built with the approval and encouragement of the Provincial Department of Health. This lagoon provided adequate treatment until very recently.

The city is now expending 2¼ million dollars to provide secondary sewage treatment by mid 1973 so as to protect the ecology down stream, particularly in winter when the volume of river flow is low. At $80 per capita, this is quite an expense for a small community.

In 1970 we also consumed on average, 2.3 million gallons of fresh water from the river every day, serving 5,970 customers; and of course to overcome our immediate deficiencies and to meet future demands, the city is currently expanding the water treatment facilities at a cost of $536,000.

The members of the Environment Conservation Authority will therefore, recognize the importance of water quality and flow to the citizens of Red Deer. It would be of great concern to us if any changes occurred upstream, through mining or engineering works, which could adversely affect conditions of flow or quality of the water.

Certainly in this day and age when the demands for water are becoming so varied, it is our opinion that strip mining, road works, or other projects should not be developed in the upper reaches of the river west of Red Deer without the benefit of an overall concept or master plan. Such a plan should seek to benefit the recreational potential of the area as well as protecting our lifeblood.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

Do you, on behalf of the City, support the Red Deer Regional Planning Commission Report?

MAYOR R.E. BARRETT

Yes. We are a member of the Red Deer Regional Planning Commission that contains the area to the east. We are vitally concerned with the Red Deer River as it effects us, but we are not losing sight of the fact that this river supplies a great many varieties of advantages to the area down stream as far as the South Saskatchewan. Those people in that area should be well cared for.

DR. WALTER TROST

Do you have reason to feel that the quality of the water has been affected by resource development to the east?

MAYOR R.E. BARRETT

We are not sure as to whether it is resource development but there is something west of Red Deer that does affect the quality of the river particularly the disolved oxygen content. Most rivers in Alberta contain about fourteen parts per million under normal circumstances. The water just before it reaches Red Deer has little over nine point parts per million. In using it to solve our sewage problem we remove more so the winter time is a critical period. We do no damage to the river during the times when the fill is normal or large but in the winter when the flow is down below 250 cu. ft. per second which it is, there is no question that damage does occur. We are doing as much as we can, as fast as we can to correct that.

DR. WALTER TROST

Do you feel that the quantity of water or the rate of flow of water might have been affected by resource developments to the west?

MAYOR R.E. BARRETT

I really do not know but I do know that 40 or 50 years ago there was at least double the flow of water in the Red Deer River than there is today. Whether it is a change in the environment west, a change in weather or climatic conditions, we do not know. We have been concerned about this for some years and have made several representations to the Provincial Government to examine the problems and see if there is not some way that they could, either by diverting water from some other source into the Red Deer River, or by damming up the river so that the spring flows could be withheld and then let down gradually during the year. All we have received from them is an assurance that they are concerned, and they had made some preliminary studies. The new Minister will probably continue and intensify the studies to see what can be done for us.

MR. PAUL BABEY

You mention that in your view the flow has been reduced substantially in the Red Deer River. Have there been any studies done indicating whether there has been a progressive decrease?

MAYOR R.E. BARRETT

I would think that the records produced by the Provincial Department would indicate this. Our Engineering Department has records available that would tell that story.

MR. PAUL BABEY

You emphasize the importance of the water to the city. If the flow remains constant how many years before water could be a crucial factor in determining the growth of this population centre?

MAYOR R.E. BARRETT

At the moment our Engineering Department is confident that there is sufficient water coming down the river to satisfy our needs for an indefinite period in the future. Our concern is not only with the amount of water which we use but with the amount of water which would assist in sewage treatment.

5.4 NICK'S LANDSCAPING

Presented by: Mr. J. Wotherspoon

I am in the nursery and hydroseeding business. Last year I spent several months in Europe, the United States and Eastern Canada to learn about the different methods of establishing growth on sterile dead soils.

This fall I was again in Europe and the States, also eastern Canada. The more I probe the more I notice the difference in attitude NOT IN PROBLEMS regarding pollution control and mine reclamation, but between North America and Common Market Europe. Reforestration and Revegetation, forming of recreation areas is becoming a way of life in Europe. Here it always seems to be a fight between corporations and anti-pollution groups. The companies win most of the time with their big threat: "If we have to spend so much on pollution control then we will have to stop our operation and reduce investing". Unemployment will come, etc. You know the stories. But this is not so. Practically in all States of the U. S., with reclamation demands on the strip mines production of coal went up, in spite of the operators claim to the contrary.

ALL LAND CAN BE RECLAIMED!!!!!

I saw a nursery operating profitable on straight sand - producing millions of forestry seedlings without the use of herbicides, pesticides or mineral fertilizers. Their main helpers are five species of worms.

I learned of systems used to establish growth on lime stone in France, on drift sand in Holland, rocks in the Alps, Dunes in Yugoslavia, etc. The time of seed germination and the selections of seed is not left to luck, but to a system, (Swedish, Norweigen and Finnish seeds of hardy grasses and shrubs and trees can be easily obtained at a lower rate than U.S. seeds but of a better quality). Seed is made to germinate within three to four days or a year later if so desired. Application of mineral fertilizers is kept down. The use of organic fertilizers, activated sludge, recycled garbage are less polluting and longer effective.

The reclamation contractor has to guarantee his work for 2 years and has to keep a close watch on the project and refertilizes within these 2 years when the need arises.

At the moment we have to import activated sludge from the U.S. on a quota basis at that. At the same time the City of Edmonton dumps many tons of sludge into the Saskatchewan River. Is this really necessary?

There are now quite a few garbage processing plants in Germany that change garbage into life humus. This humus is used for instance to revegetate the mine site of the Portland Cement Company in Southern Germany, a very successful project.

Consideration with all mine site reclamation has to be given to stop and prevent erosion and therefore water pollution. All humus bearing soil should be saved wherever possible and spread over sterile surfaces. Slopes should be kept as short and gentle as feasible. Long slopes have to be terraced. Surface water has to be channeled properly to stop the danger of wash-outs and erosion. All reclamation should follow the mining work at once. All mines can save money if they gear their operations to consider reclamation in all their work and plans. Each mine site should be evaluated separately and classified into

1. Wildlife and Forestry
   This means more or less re-establishment of destroyed vegetation mainly.
2. Agriculture and Prairie Parkland for Game and Birds
   Establishment of grasses and bushland
3. Recreation
   I prefer recreation very often in combination with forestry and agricultural use.

The Lake Wabamun strip mine is a typical recreation site but only water polluter at the moment. I suggest to build at Lake Wabamun the largest recreational centre in Western Canada.

The overburden has to be moved away, so why don't move it in a manner that ski slopes, toboggan runs, riding paths, campgrounds, skidoo runs, etc. are formed.

Plant growth has to be established, so instead of seeding just grasses, why not a few acres of flowers, a few acres of shrubs of one kind, etc. Use your imagination!!! Here we have the perfect site to do something for the public.

The presence of the power plants adds to the problems of the lake. This would not be permitted in Germany! There they very often use swimming pools as water coolers. Why don't we do it here?

If we had two large pools, one with a wave machine (simulates waves of the ocean) with warm water at Wabamun, then this waste land would be a year round recreation area for 1/2 million people and also a big tourist attraction independent of the weather conditions or seasons.

The NEW OHIO STATE LAW provides a good example of what the reclamation laws should be like, as long as they are properly enforced.

Please give my suggestions some thought. I will provide with a 16mm movie (approx. run 8 min.) showing reclamation work done for the last 40 years at one of the largest strip mine operations in the world.

Changing of mine sites into attractive landscapes to increase tourist traffic should be given highest priority. Seeding of flowers and suitable shrubs and trees should be made mandatory. Naturally grasses and a few legumes have to be used as a base for erosion control. Just visualize a field seeded with a grass and poppy mixture, or a few areas with some bright red dogwoods (cornus alba sibirica) and grass and shasta daisys as undergrowth with the odd Silverleaf Buffaloberry mixed in. It can be done! And the per acre costs are not much higher.

Tourism is big business and growing rapidly. The Government should sponsor contests re designs of master plans for mine site development to assure that the best designers will get the contract. Vegetation should be established as fast as possible.

All pollution control has to be in the hands of the Ministry of Environment. Many inspectors with broad powers have to be employed. The inspector must have the right to halt all operations if the individual or corporation does not comply with the law.

Any private citizen of this Province must have some kind of legal way to sue the offender and the Government officials responsible if pollution is allowed above the permitted level.

The Government should start charging monies for its services. Pulp mills, mine operators, oil companies, etc. call on all kinds of Government agencies to solve their pollution problems, problems that were created by these companies in the first place. The best example are the research projects for reforestration after pulpmills denuded the bush. Or the Swan Hills erosion study and many similar projects.

Do not get me wrong. I do in no way suggest to stop this work because the people involved in these projects are experts and produce excellent results. But I think there should be some kind of tax to recover this money from the corporations responsible and not from our tax money.

I wholeheartedly support the idea of training future heavy equipment operators on old mine sites. This would provide jobs but it also is probably the only way to eventually raise a group of operators that have some respect for nature. Most cat operators I see at work seem to take pleasure in destroying vegetation. Very, very often more trees than necessary are pushed over, especially in oil field work and mine exploration.

Coal mining and exploration should not be allowed above timber line. It takes too long and sometimes proves to be impossible to re-establish vegetation high in the mountains.

The New Ohio State Laws on Mining are probably the best for the people right now and with some modification will work here too.

5.5 A BRIEF BY THE RED DEER FISH AND GAME ASSOCIATION

PRESENTED BY MR. R. SCAMMELL

The Red Deer Fish and Game Association, an affiliate of the Alberta Fish and Game Association and a sustaining member of the Canadian Wildlife Federation, has been active in the City of Red Deer since the 1920's. The membership of the Association has been as high as 1500, but generally averages around 600 members, mostly from the City of Red Deer. One overriding concern has charactarized the activities of the Red Deer Fish and Game Association over the years, and that is a concern for the Red Deer River. The Association is particularly pleased this year that Red Deer City Council has resolved to discontinue the dumping of snow cleaned from city streets onto the ice of the river, and also, at great expense, to construct a mechanical sewage treatment plant. Both decisions culminate what has been a long campaign for the Red Deer Fish and Game Association. Unfortunately there are other threats and the campaign must go on.

This brief is being presented by Robert H. Scammell, immediate past President of the Red Deer Fish and Game Association, and first Vice-President of the Alberta Fish and Game Association. Mr. Scammell is a Barrister and Solicitor, practising in Red Deer and also for the past six years has written a weekly outdoors column for The Red Deer Advocate.

The Red Deer Fish and Game Association wishes to thank the Environment Conservation Authority for giving organizations and citizens in Red Deer and area the opportunity to have a hearing on strip-mining, in effect the last of such hearings in Alberta. Bearing in mind that many briefs have been presented to the Authority up to this point, we will attempt not to go over old ground but to offer some new material for your consideration and to make some comments on matters that have been raised before you in other briefs.

Generally, the Red Deer Fish and Game Association believes that at this point in time the whole problem of strip mining for coal or other minerals in Alberta must be looked at with a good measure of skepticism and cynicism. We are mindful of the fact that for years the previous Government of this Province was criticised by well-informed people for the pitiful inadequacy of The Surface Reclamation Act. We are also aware that a District Court Judge in Alberta, earlier this year in open court, in the case of Buchta vs Fox Coulee Coals Ltd. and the Surface Reclamation Council, [1971] 2 W.W.R. 476 called The Surface Reclamation Act and the Surface Reclamation Council, in effect, a joke. The immediate response that case drew from the Government was an angry threat to appeal the decision. Now that it has been judicially established that the surface reclamation laws we have had for many years are nothing but a joke, we believe that any proposals for new surface reclamation laws must be viewed with some skepticism and some cynicism.

Even more, we are skeptical and cynical concerning the word "reclamation" and what it means. If the word is to mean what it means in so many dictionaries, we would suggest that there is no way whatsoever of returning many of the proposed strip mining sites in Alberta to agricultural production, nor can we see any reason why prime mountain or foothills areas should be returned to agricultural production. It also seems obvious to us that there is no way of returning many mountain and foothill sites to what they were before - mountains or foothills. The doubt we express in this regard is a mere reflection of rather wide-spread views now taking hold in the United States, views which should at least interest us if not guide and influence us. In 1965, the United States' Bureau of Mines said that over 1.3 million acres in the United States had been stripped by coal operators. From then to August of last year another 480,000 acres had been stripped, but only 56,000 had been reclaimed. These very depressing figures have had their result in the United States. Three environmental organizations have recently filed a Federal lawsuit in the United States District Court for the Southern District of New York, asking the Court to find that the Tennessee Valley Authority has disregarded The National Environmental Policy Act of 1969. More startling is that in the last year at least a dozen bills have been introduced in the United States Congress to deal with strip mining. The toughest of these bills, sponsored by Ken Hechler of West Virginia, Bill H.R. 4556, would ban all strip mining in the United States within six months. What is extremely interesting to note is that seemingly extreme measure, last August, had attracted more than sixty-five co-sponsors in the House and was attracting support in the United States' Senate as well.

In view of concern such as this in the Country that probably has more experience than any other with the problem being discussed at these hearings, we are somewhat alarmed that what we are being asked to discuss is the content of proposed surface reclamation legislation rather than the more basic question of whether or not strip mining of coal should be permitted at all in Alberta.

The major concern of this Association has not changed, and it remains concerned for the Red Deer River, perhaps not a surprising concern for a group coming from a City served by a small river which is plagued by low flows and low oxygens. It pains us to have to advise you that a little over a week ago "The Red Deer Advocate" once again carried the headlines that the river was being choked by low oxygens, the earliest in our memory that this particular frequent headline has run. It is not generally realized how precarious the position of this City is, but if the flows of the Red Deer River are much more depleted, the future growth and, ultimately, the future existence of this City is at stake. Surely the future existence of a City in Alberta is of concern to the Government of Alberta. There is precedent and validity for this kind of argument as we understand that the coal operators have appeared brfore you at these hearings and have made emotional appeals for the continued economic survival of the coal towns which, presumably, to hear the operators tell it, only the continued strip mining of coal can assure. We believe that the Government should know there is a possibility that the continued strip mining of coal in Alberta may jeopardize the continued existence of even larger centres of population.

The low oxygen levels and the low water flows of the Red Deer River have been well-documented over the past recent years by the Departments of Health and of Lands and Forests as well as by the Water Resources Division of the Department of Agriculture, now the Department of the Environment. The powers of the Environment Conservation Authority make these figures even more available to you then they are to us. Where the water is going from the Red Deer River and why the oxygens are so low are officially regarded as mysteries. What is clear is that the Red Deer is a river in trouble. Our Association is gratified that the City of Red Deer has now recognized a large part of its responsibility to the river, and we believe it is time now that the Provincial Government recognized its responsibility to this

City, and to the people who live here.

It is difficult for any citizen or citizens' group to get the complete picture, but it is known that extensive exploration and ultimately open pit mining for coal will take place at or near the headwaters of the Red Deer River. This provides a classic example of the situation your Authority is warned about in the report prepared for you by F.F. Slaney and Company Limited of Vancouver, where the actual surface disturbance is geographically concentrated, but the effects of such disturbance are far-reaching. Hard and honest thinking decrees that open pit mining at the headwaters of the Red Deer River will have distinct and deleterious effects in and on the City of Red Deer.

A major effect will be siltation. Again, we refer to the Slaney Report at page 10 which points out the sediment yield from strip mining proportions of a water shed can be measured at ten to fifteen hundred times the sedimentation yield from undisturbed lands. In this connection, we refer you to U.S. Geological Survey Professional Papers 427 A, 427 B, 427 C.

Major siltation of the Red Deer River could be disastrous in terms of further reducing the dissolved oxygen levels in the river water and the flows of the water itself. With regard to acquatic life, one need only point out that time and again Alberta's fisheries biologists, employees of the Government that has urgently commissioned your report on strip mining, have warned that the most serious pollutant in Alberta's streams is purely and simply silt.

A portion of the Slaney Report, at Page 42, says: "If there is no method of preventing undesirable social costs and these costs cannot be tolerated - for example, extensive damage to the head waters of the Saskatchewan River system - then there is no alternative but to prohibit that particular operation". Substitute the words "Red Deer River" for Saskatchewan River system, and we completely endorse that statement.

We are unable to endorse, however, the statement of Page 41 of the Slaney Report which states that the loss in aesthetic values from surface mining in unspoiled natural environments or in the Rocky Mountains cannot be given any realistic value. We know that the scenic and aesthetic attributes of the Red Deer River Valley and the country west of this City have a great value, and we submit it is a failure of science or a paucity of imagination that suggests no realistic value can be put on it. We submit to you that considerable strides have been made in this field in the past few years, and just as a starting point we recommend to the Authority the article "Landscape Esthetics - How to Quartify the Scenics of a River Valley" by Luna B. Leopold, from "Natural History", October, 1969.

We are aware that your deliberations have been complicated by representations made by the coal industry. Our first comment is that it is bitterly amusing to see the fledgling coal lobby in Alberta starting to come out with the arguments that the all powerful coal lobby in such places as West Virginia and Kentucky are now able to cram down the throat of the people with impunity. If nothing else, we would suggest strongly to the Environment Conservation Authority that it recommend to the Government that it be ever vigilant against the acquisition of power that is too great by the coal lobby. How monstrous now must seem the blandishments of the coal operators that Kentucky and West Virginia could not afford not to strip mine in those areas of Kentucky and West Virginia that are now disaster areas and pockets of poverty because of the impoverishment of the land brought on by the very strip mining that was to be the economic salvation of these areas. The operators now hang out before the public of Alberta the carrot of strip mines and exploration roads opening up recreation lands. We are certain we need not tell the Authority that the opening up of additional recreational lands in Alberta has long ceased to be of much benefit to the Province as a whole that it should be used to justify the making of decisions as important as those which must be made about strip mining. With regard to the ways and means and developments of the coal mining lobby, we can recommend no greater instruction for the Authority than a reading of a book by a Kentucky Attorney, Harry Caudill, "Night Comes to the Cumberlands".

We have examined with care the abstract which has been given to us concerning the possible contents of surface reclamation legislation to be introduced into the 1972 session of the Alberta Legislature.

Basically, if the decision that we shall strip mine coal in Alberta has already been made, then the proposed legislation appears to us at the very least to be an improvement over what we have now.

We would suggest that the legislation does not appear to grapple with the basic concept of just what "reclamation" is to be. Is it to be the returning of land to agricultural production, or is it to be the returning to land to its former state? It is only by grappling with what the word "reclamation" is to mean in the legislation that the true difficulties of this whole problem will be made apparent, the problems of whether or not it is possible or even desirable to return foothill or mountainous terrain to agricultural production.

Generally we feel that the proposed legislation is good, and particularly good is the requirement that a performance bond be posted by the operator to guarantee that such reclamation measures as can be carried out will be carried out.

The legislation does appear to us to be inadequate in that it does not provide for what now is commonly known as "an impact" statement setting out the immediate and far-reaching consequences of any strip mining proposal. The proposed legislation also does not make it clear that there may be areas and situations in Alberta where no strip mining may be carried out, particularly areas or situations in Alberta where an impact statement reveals that either the long-range economic costs of the strip mining exceed the short range benefits, or that the social costs of the strip mining are too great to be justified. The proposed legislation does not also make it clear that where the social or economic costs are too great, then a particular project would not be carried out and no projects in fact would be carried out, even if mineral dispositions have been made sometime previously.

In this latter regard, we submit that a case can be made that no strip mining whatever should be allowed on the immediate water shed of any river servicing large population centers in Alberta, the Red Deer being a good example and probably the Old Man in relation to the City of Lethbridge being another good example.

We believe that absolute prohibitions against strip mining on the Red Deer and Old Man water sheds would be in the best interests of the people of this Province, and if there are to be such prohibitions we suggest that they be established and set out now. The general attitude of mineral developers in Alberta is that they like to know what the ground rules are, and if it is to be "hands off" they can live with such a decision so long as they know it applies to all development.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

You commented on the need for an environmental impact statement and you have described the contrasting situations in the prairies and in the mountains. Do you think it would be advantageous to have the legislation and the regulations broken into two parts; one effective in the prairies and one in the mountains?

MR. R.H. SCAMMELL

Not only are there differences in the applicable procedures of reclamation in the two types of terrain but there are significant differences in the way the mining itself is carried out. To combine everything in one act may cause a situation that would lead to confusion and difficulty for operators and the public. When the surface reclamation act is passed it must apply in the mountainous areas. We do not want the situation that prevailed two years ago when there were no reclamation regulations whatever in that area.

DR. WALTER TROST

With good environmental management for protecting areas or sites in the mountains and the uplands, do you think the desirable way is by specific locations or one in which whole areas have to be protected regardless of how the sites may change within areas?

MR. R.H. SCAMMELL

The modern legal concept of river management is basin or watershed management. In researching the effect on rivers and streams the whole watershed is looked at therefore protection will have to be on the basis of watershed planning. The watershed will have to be protected in various ways There may be areas where strip mining will not be allowed at all and others where strip mining can be done if very rigid precautions are taken.

MR. PAUL BABEY

You suggested that another look should be taken at some of the leases in areas where there are watersheds for some of the rivers. Can you foresee any legal complications in trying to retrieve the ownership?

MR. R.H. SCAMMELL

I am unable to foresee any legal problems as I have not been able to look at some of the leases yet. There might be some problems with regard to compensation or with expropriation. In my view there is ample authority in a great number of Alberta Acts for a Government Cabinet Minister to say "NO". As in the Cypress Hills case two years ago when the Minister of Lands and Forests, Dr. J. Donovan Ross, said an oil company could not drill in the Cypress Hills Park regardless of the case. The cabinet overruled him but he had the power at that time and in the final analysis, you can't blame anybody because a democratic decision was taken. The point I make is that in that instance the legal power was there for him to step in, act, and in effect, stop something and I firmly believe that he could have stopped it forever except he subjected himself to the rule of the majority in a Cabinet decision.

5.6

Brief to the Public Hearing on the Environmental Impact of Strip Mining at the Red Deer Memorial Centre - Thursday, January 6, 1972

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President

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The purpose of this brief is to outline the present regulations covering the exploration work for seeking coal and proving coal reserves in the foothills and mountain areas of Alberta. We believe there is insufficient recognition being given to the actual broad scope that the present regulations encompass. A brief reference will be made to drilling for coal in the prairie regions of this Province and finally some comments covering open pit mining activity.

Laws & Regulations:

Coal exploration comes under the geophysical regulations for the Province of Alberta and these rules and regulations are provided under authority of the Mines & Minerals Act, the Public Lands Act, the Forests Act and the Public Highways Act. The regulations themselves consist of 16 pages of rules which, can be amended or revised at any time by order-in-council. A brief outline of the coverage of these regulations are as follows:

1. Use of land for geophysical operations.
2. Preliminary plans required to be filed with the Minister of Lands & Forests.
3. The monthly plans required to be filed with the Director of Minerals and, in certain instances, with the Department of Lands & Forests.
4. Final plans required to be filed with the Minister of Lands & Forests.

5. Geophysical operations in relation to the survey lines and monuments.
6. Operations in relation to highways and public roads.
7. Penalties and procedures in respect to damage to property.
8. Restrictions as to location of drill holes and test holes.
9. Conduct of operations in forested areas.
10. Permits required to operate exploration equipment such as drills & trenching machines and other geophysical devices.
11. Procedures in properly completing drill holes and test holes.
12. General regulations and penalties for failure to comply with the provisions of the Geophysical and Exploration regulations.

Operating Procedures:

The exploration for coal in the flat or prairie areas of the Province is generally confined to drilling holes of 3" - 5" in diameter which intersect the coal measures. Because of the scarcity of coal outcrops in the prairie areas, very little surface excavation or trenching methods are utilized. Before an area may be drilled, the Director of Minerals of the Department of Mines & Minerals must be advised and additionally the county or municipality in which the exploration is to be conducted, must also be advised. In the prairie areas, the majority of the surface is privately owned or occupied in the case of government owned land and permission of the owner or occupant must be obtained before that land can be entered for drilling. Therefore, as a general rule, most preliminary exploration work in the prairies is confined to road allowances.

It should be mentioned here that in the many years of extensive seismograph drilling in connection with oil exploration methods, and at a time when very few regulations respecting this type of work had been put forward, a certain amount of abuse to roads, farmers fences and ditches, was indeed committed by a small minority of operators but since these regulations were introduced in 1959 the work that has been conducted in the prairies has been acceptable to the public and many of the detrimental operations that were carried out in the 1950's have ceased. This is a good example of why laws and regulations have to be brought forth by our legislature in order to curb careless activity by a small group.

Exploration for coal in the "green area" of the Province or that area which is forested with evergreen trees and which includes the bituminous coal bearing areas in the foothills and mountains of Alberta is of much more ecological importance and of very great concern to the public at large.

A potential coal bearing area that is selected by a company for exploration work in the foothills has been preceded by a great deal of research work consisting of geological studies and investigation of other available mining literature, together with a geological and survey reconnaissance carried out on foot in order that the programme can be planned in detail.

Before the actual work of exploration can be commenced, a preliminary plan in duplicate must be filed with the Minister of Lands & Forests and approved by him. The preliminary plan shall show in detail an outline of the area in which exploration is to be undertaken, the approximate location of roadways to be used to gain access for such exploration, the existing trails and lines to be used, the proposed trails and lines to be cleared and the proposed campsites and air landing strips to be used. It must show the name of the licencee making the plan and the number of the licence, the names of any permitees who will be conducting the geophysical operation on his behalf; show the intended date of commencement of operations and the type of equipment to be used in the operations.

At this point, it would be useful to extract from a sample letter written in 1971 by the Deputy Minister of the Department of Lands & Forests to this company which set out 18 provisos to be followed during our exploration of an area we had applied for by preliminary plan. It should be noted that some of these provisos are similar to the regulations for conduct of operations in the green area of the Province and some in addition thereto. The provisions are as follows:

Quote:

"1. Prior to any operations commencing on this programme, a security deposit of $10, 000.00 is to be submitted to this Department.

2. It is the responsibility of the company to determine the ownership or other interests in the land designated in the sketch attached to the request.

3. Access trails shall not exceed sixteen (16) feet in width and shall be constructed with a minimum of surface disturbance. Existing trails shall be utilized wherever possible. New trails must be flagged by the company and their location approved by an officer of the Minister before clearing commences.

Quote: cont'd

4. All necessary precautions to be taken while trails are under construction to prevent the inception of soil erosion and sedimentation into streams. Trails shall be constructed in such a manner that inside ditches are not required unless otherwise directed.

5. All backfilled areas and other areas of bare soil must be reseeded to a suitable mixture and vegetative growth re-established to the satisfaction of an officer of the Minister.

6. Stream crossings shall be kept to a minimum and only one crossing is permitted at any intersection of a trail and stream. Trails shall cross streams at right angles to the stream channel and where necessary, diversion trenches shall be constructed on approaches to streams to prevent siltation.

7. No debris, soil or overburden shall be deposited or allowed to enter any watercourse and the stream courses shall not be diverted or altered in any way. Stream flow shall not be carried in road or trail ditches.

Quote: cont'd

8. Except for crossings, no trail shall be constructed within 150 feet of the banks of any watercourse unless necessitated by the terrain, in which case the requirement may be waived by an officer of the Minister.

9. Drill hole locations shall be approved by an officer of the Minister and shall not be located less than 150 feet from the high water mark of any stream.

10. No campsite may be established without approval of an officer of the Minister.

11. Cleanup of debris shall be conducted to the satisfaction of an officer of the Minister and to be in accordance with The Public Lands Act and The Forest Protection Regulations.

12. Cleanup and reclamation shall be conducted in progress with the programme.

13. The company shall conduct the operation in a manner that will preserve the aesthetic quality of the area and in this regard shall carry out as little clearing as possible.

14. Revisions of the programme requiring additional trails, drill holes or substantial changes in location must be resubmitted and approved by an officer of the Minister.

Quote: cont'd

15. Continuous liaison shall be maintained with the officers designated by Forest Superintendent L.P. Gauthier of the Bow River Forest and these officers will oversee your programme.

16. Wherever possible, or upon request, berms of debris and soil along trails are to be removed to allow for proper drainage. Unstable areas such as seeps and slump topography shall be avoided. Trails shall be located on ridge tops where possible to avoid heavy cuts.

17. Before a drilling rig is moved away from a drill hole, a tag indicating the company name and drill hole location is to be placed facing and in close proximity to the hole but in no case more than thirty (30) feet from the hole location.

18. A copy of the monthly plans presently being submitted to the Director of Minerals should be forwarded to the Director of Lands and the Forest Superintendent of the Forest wherein the programme is being conducted.

The authorization of this exploration programme does not in any way commit the Department to the issuance of a lease for mining." Unquote.

This company has been active in exploration work in the foothills since 1964 and we believe we have conducted our exploration work in a manner conducive to a minimum of disturbance to the environment and in all cases to the satisfaction of the officials of both the Department of Mines & Minerals and the Department of Lands & Forests.

As an example, we have worked in the Highwood area (for the past two years) which straddles the Kananaskis - Coleman forestry trunk road between the Highwood Pass and Mist Creek and we challenge anyone who drives by, today, to identify where our access roads were located or where the coal was trenched.

The method employed by us to examine and sample an outcrop of coal in the foothills is not by "bulldozer" but rather by "backhoe" whereby a two foot wide slot is cut into the coal up to 20 feet deep. The excavated material is piled alongside the trench and subsequently back filled as soon as the necessary data is recorded.

Large samples of coal at greater depths are obtained by various drill hole enlargement techniques rather than attempting a small open pit.

As has been stated by others, exploration roads provide access to areas in the foothills for hunters and fishermen and additionally, provide emergency access in the case of fire-fighting requirements.

With reference to the report on Environmental Impact of Surface Coal Mining Operations in Alberta by F.F. Slaney and Company Limited we believe that their recommendations are now in fact being carried out by responsible companies and that the present rules of procedure that have been formulated by the government in respect to exploration techniques provide the protective and restorative measures necessary for the protection of the environment.

Costs:

In order to put a handle on land use in the foothills we make reference to data that has been developed by ourselves.

In the Gregg River area, 30 miles south of Hinton, our land use for access roads, operating roads and drill sites was five (5) acres to prove in detail 1,000,000 tons of bituminous coal. Most of this acreage would be in the same area as the proposed mine.

Granted there are wide variations in this sort of rule thumb, depending on previously built access roads and the complexity of the coal formation structure.

Again, as a rough guide, it will cost $100,000 to prove up 1,000,000 tons of coal. All of which shows that something in the order of $20,000 per acre of land use is spent in exploration to the advanced point of a "measured reserve and quality" classification.

In our case more than 95% of our exploration expenditures have all been paid out to Alberta residents, as labour, repairs, operating supplies, equipment rentals and building rentals.

General Comments on the Subject of Coal Mining Operations in Alberta

1. One acre of coking coal recovered by open pit mining from a 30' seam (which is about the average thickness being mined) will yield 40,000 tons. About 70% of this will be a coking coal saleable product with a value F.O.B. railway car of about \$9.00 per ton or 40,000 x .7 x \$9.00 = \$250,000 plus a freight rate value

to the Alberta border of \$1.00 per ton	=	40,000
for a total value at the border of		\$290,000
		per acre of coal mined.

Compare this to the value of pulpwood which after being cut, processed and sold as kraft has a value of \$2,500 to \$3,000 per acre (i.e., 30 cords of pulpwood per acre and ½ ton of pulp per cord of wood and one ton of pulp equals one ton of kraft which sells at \$180 per ton). A further comparison can be made on the basis of dollars paid out in wage and fringe benefits for local labour, supervision and engineering directly on the payroll of the mining company which is about \$80,000 per acre of coal mined. At the hearing in Calgary in December, Mr. M.H. Drinkwater, of Canada Department of Environment, stated that hunters and fishermen spent \$.25 per acre of foothills, on the basis of a survey made in the early sixties.

General Comments (cont'd)

2. The talus slopes (i.e., broken rock at the foot of a cliff) that lie at and near the base of our mountains are composed mainly of limestone, dolomite and marine shales. This material is formed by the mechanical agencies of erosion, that is, ice, snow, rain, wind and heat and during seasonal periods of spring run-off and heavy rains huge amounts of solid material from these talus slopes are introduced into the various streams feeding our main rivers. This process is the source of the siltation and turbidity visible in our water courses during certain periods of the year and the proportion of this yield of solids to that caused by run-off from surface mining activity must indeed approach infinity as a value.

3. Pre-planning as recommended by the F.F. Slaney report is the key to success and we agree. However, pre-planning cannot be accomplished if indefinite guidelines as to overall procedures exist. For example, if the Department of Lands & Forests approve exploration in an area but specifically state that it is not committed to issue a surface mining lease pre-planning becomes frustrated.

4. Catchment ponds located on tributaries of major streams to prevent migration of sediments seem ideal. We question, however, if the Water Resources Branch are in complete agreement in their use; what then are the alternatives?

General Comments (cont'd)

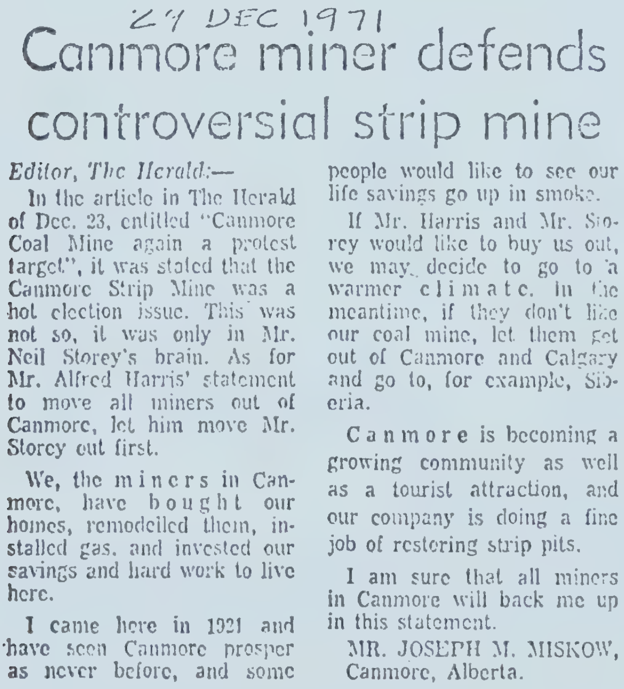
5. We have been made aware of a grazing area in the Highwood Pass that was proflific in Elk fifteen to twenty years ago; today that grazing area is practically barren of game. There is and has been no industrial activity in this area, what has caused the reduced number of wildlife?

6. There have been many suggestions that there should be a greater emphasis on underground mining but this segment of the coal industry is already in difficulty because of the lack of mining labour and the gap is partially being filled by importing people from other countries of the world when, at the same time, our government is concerned with high unemployment. We can only conclude that the only way to attract underground labour is to greatly increase wages and salaries and this would tend to overprice our coal in the world market place.

7. Perhaps with efficient mining Alberta coal could displace some or all of the eastern Canadian coal that is now being imported from the U.S.A. and which now amounts to some twenty millions of tons annually a large part of which is used in making coke by the eastern Canadian steel industry.

General Comments (cont'd)

8. It has been suggested by critics of surface mining industry that coal production should be severely limited and that the individuals affected should be retrained and relocated. The following letter is reproduced verbatim as taken from the Calgary Herald of 29-Dec-71. Its message is stated plainly and simply although not without reference to personalities.



29 DEC 1971

Canmore miner defends controversial strip mine

Editor, The Herald:—

In the article in The Herald of Dec. 23, entitled "Canmore Coal Mine again a protest target", it was stated that the Canmore Strip Mine was a hot election issue. This was not so, it was only in Mr. Neil Storey's brain. As for Mr. Alfred Harris' statement to move all miners out of Canmore, let him move Mr. Storey out first.

We, the miners in Canmore, have bought our homes, remodelled them, installed gas, and invested our savings and hard work to live here.

I came here in 1921 and have seen Canmore prosper as never before, and some people would like to see our life savings go up in smoke.

If Mr. Harris and Mr. Storey would like to buy us out, we may decide to go to a warmer climate. In the meantime, if they don't like our coal mine, let them get out of Canmore and Calgary and go to, for example, Siberia.

Canmore is becoming a growing community as well as a tourist attraction, and our company is doing a fine job of restoring strip pits.

I am sure that all miners in Canmore will back me up in this statement.

MR. JOSEPH M. MISKOW,
Canmore, Alberta.

9. There appears to be an impression in some quarters that North America's remaining coal reserves are concentrated largely in Alberta. This is far from the truth. The estimated remaining reserves of coal are 92% in the U.S.A. and 8% in Canada. Alberta contains an estimated 37% of Canada's reserves or roughly 3% of Canadian-U.S. reserves.

General Comments (cont'd)

10. Finally, we have noted that the briefs presented on behalf of industry have been done so by individuals who for the most part have no investment in the company they are employed by and who stand not to gain in profits, if any, of the mining operators. They are professionals and technicians, many native Albertans, who take pride in contributing to the well being of our nation and who have spent countless hours at their work and in educating and training themselves. It seems fair to conclude that they are capable of performing in a responsible manner in all things concerning our environment.

This last paragraph referring to the Department of Lands and Forests not being committed to the issuance of a surface lease for any future mining, must obviously be highly disturbing to anyone who is going to invest $50,000 or up to $5 million to explore an area and prove a coal reserve by the mere fact that there is no guarantee that they will be able to carry out the mining if the property is attractive.

Immediately before the actual work of exploration commences, the local forest superintendent is contacted and an advance party discusses the proposed operations and traverse the area as much as possible by either 4 wheel drive or in certain cases by helicopter.

As work is in progress frequent contact is maintained with the local superintendent and any changes required by the Forestry officer are carried out in accordance with his requests.

On completion of the programme cross-ditching for erosion control and seeding are carried out. The forestry officer will make a final inspection on the work and if requested by him some of the trails may be sealed off to prevent damage from people with terrain vehicles breaking down erosion control ditches and disturbing seeding.

A detailed final plan is then prepared and provided to the Minister of Lands & Forests. All drill hole information is sent to the Director of Minerals and additionally, once a year, the logs of all the drill holes, are provided to the Energy Resources Conservation Board.

MASTER EXPLORATIONS LTD. - COMMENT

MR. E.J. PANCHYSYN

MR. E.J. PANCHYSYN

I would like to take this opportunity just for a moment, I don't want to be critical of Mr. Webb, but he seems to get his decimal places in the wrong place. The question was asked of him - three million tons per year a six foot seam - mormally you consider thirteen hundred to fifteen tons of coal per foot acre. Six feet would be six times say thirteen hundred which is about eight thousand tons per acre. Three million divided by eight thousand is something in the order of four hundred acres. Not 2000 acres.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

In the exploration part of coal mining do you locate, develop and define the deposit so that a mining plan can be developed from your work?

MR. E.J. PANCHYSYN

Yes. We have really two phases of exploration. One would be the preliminary exploration and the second we might call development exploration. This is defining the quality of the coal plus or minus 5% to 10%.

DR. WALTER TROST

In Calgary a submission had been made to us describing a geophysical method of coal exploration. I know you are familar with it. Do you want to comment on that?

MR. E.J. PANCHYSYN

This is induced polarization and we have used it although in a negative manner as we have to drill holes and recatch lowering the quality. Induced polarization however, will partially eliminate the need for access into areas for initial exploration.

DR. WALTER TROST

So you might use it as an initial sieve but you still have to use the more direct method.

MR. E.J. PANCHYSYN

My conclusion is if you run an I.P. Survey over an area it will tell you if there is no coal. It may give indications of coal which may prove to be somewhat economical or may be very high ash or carbonation shale.

MR. PAUL BABEY

It has been suggested that the use of helicopter instead of the bulldozer for exploration could reduce environmental damage. Would you care to comment on that suggestion.

MR. E.J. PANCHYSYN

We do use a helicopter and get several hours flying time. We use geology maps put out by the Geological Survey of Canada and topographic maps put out by the mapping people with the Alberta and Federal Government. We also practice foot reconnaissance or geological reconnaissance because moving a piece of equipment such as a D.8 or a D.7 Cat is a tremendous cost. Instead we put geologists and mining engineers into the field along with some help and even do some hand trenching which is minimal. We use helicopters in our preliminary reconnaissance on many of our properties.

5.7 A PRESENTATION TO THE ENVIRONMENT CONSERVATION AUTHORITY ON STRIP MINING IN ALBERTA, JANUARY 6, 1972, BY HENRY LEMBICZ.

To operate or to not operate, that is the question? Strip mining is an operation whereby great pits are gouged out of the body of Mother Earth to remove coal and other minerals. These operations like operations on mankind will heal providing proper technics and care are experienced during and after the operation. The operation should be carefully and fully diagnosed before the operation takes place. Each operation should be determined on an individual basis according to the area and impact it will have on the patient, our living earth. Before the operation thorough study should be done for the reason for the operation. In practically all cases the operation would be done, not for the good of Mother Earth but to satisfy the desires of mankind. In all cases the operation will leave scars. In some areas the scars will heal with proper treatment, but in others they will never heal. Therefore each operation must be evaluated on the need for the extraction of minerals. The common need is for employment of people and for finances to buy more material things and to add to their comforts of life. In our affluent nation the question arises, when do we reach a satisfying quantity of material things and conforts of life? It is apparent that the more our people have the more they want. There is no valid reason to believe that affluence brings greater happiness to mankind. However, the natural desires of man must be recognized. Therefore wise control and enforcement are necessary for these operations. In evaluating the need for our present generation consideration should be given, also to future generations.

In order to make suggestions for sensible strip mining operations I would like to start with the less objectionable areas, such as prairie or parkland areas where no major change or destruction would take place. First the reason and need must be assessed. Then the impact on the natural terrain, the productivity of the soil, the impact on wild life and plant life in the area and methods of handling pollutants must be considered. In order to obtain a sensible reclamation of the disturbed top overlay of the mineral all top-soil and organic material must be stripped and stock-piled. Next the mineral top soil must be stock-piled separately.

A plan must be known beforehand of what the reclamation area will consist of and what plant life will be suitable to bring the best results. As wildlife habitat is vanishing fast I would suggest that most of the reclamation projects be set up as wild life habitat. The terrain should be of a rolling nature with small ponds. If it is feasible a pot hole fishery should be established. In some areas recreational facilities may be an asset if properly planned. As the strip mining operations progress leaving piles of overburden, these piles should be contoured to form the desired topography. Then the stockpiled mineral soil should be distributed as evenly as possible, followed by the distribution of the topsoil and organic material. This to be done as soon as possible. Trees, underbrush and other suitable plant life should be planted. Chopped straw and other organic material strewn in the area would hasten the productivity of the soil. Any suitable sewage should be stored in lagoons, treated and then applied by sprinkler irrigation to stimulate the productivity of the newly placed top structure. At Pennsylvania State University two plots of overburden from a strip mining operation were set up as test plots. One plot was seeded and left as is with only some sprinkling of water to encourage germination of planted seeds. The other plot was sprinkler irrigated with sewage effluent. The plot treated with sewage effluent had considerable growth and the plot sprinkled with ordinary water had very little growth.

Any pollutants harmful to plant or other life should be disposed to the under ground, or incinerated which ever is the most feasible.

Strip mining in the foothills or mountainous areas is a different story. There are many more liabilities attached such as destruction of water conservation areas and underground water channels, destruction of recreational areas and aesthetic values, polluting of streams with silt and chemicals, destroying wild life pastures and other habitat, building roads for transportation of minerals and vehicles, housing accomodations. All this upheaval accompanied by the noise of machinery and man and man's intrusion discourages wild life, which will abandon the area. Another point that must be considered is that when the mineral such as coal is removed it is gone forever, and in many cases in the area scars to Mother Earth will never heal. Consideration must also be given to downstream users of water as to how the operation will affect their water supply and condition.

After estimating the liabilities against possible assets I do not believe there are many strip mining operations that would qualify for operation at this time, especially in the Forest Reserves, on the Eastern Slopes of the Rockies. If the margin is for employment alone, then the operation should be rejected as it would be better to find constructive employment for people rather than destructive employment.

If after evaluation of all the liabilities and impact on the environment by the operation it is found that it is profitable to strip mine in the area, then I recommend that special consideration be given to controlling pollutants that come from the operation. Harmful pollutants must not be dispersed to the water, soil or air. Questionable sources on seepage of water from the operation should be held in reservoirs for testing before release. Mining overburden, soil erosion and silt should not be allowed to enter streams or other water. Special planning must take place to reclaim the area with emphasis placed on a quick regrowth of plant life.

The stock piling of top-soil and organic material and replacement for reclamation could be done in the same manner as previously explained. The old method of exploring with a bulldozer must be outlawed and a technique followed that does not disrupt the surface of any area. In regards to mining contracts a reclamation deposit or bond should be a part of each contract. All work should be done in the area with the impression that it is a privilege and not a right.

The decisions should be made by a special committee with a representative from each department involved and with at least one independent member who is noted for using good common sense. This committee in consultations with ministers from involved departments should be capable of sound decisions. In all cases a reclamation deposit or bond should be part of the contract.

Respectfully submitted,

Henry Lembicz.

5.8 ALBERTA WILDERNESS ASSOCIATION

Presented by: W. J. Ditchburn

The Alberta Wilderness Association, an organization dedicated to the preservation, conservation, and wise use of Albert's wilderness and wildland habitat has prepared this brief on the question of strip mining in response to the announcement of the Environment Conservation Authority dated Nov. 16, 1971. While we welcome this opportunity to present our views to the government in public forum, we believe the Authority has allowed too little time for the preparation of briefs by the public on this very important topic. We also note that the Authority has chosen to concentrate on "all aspects of reclamation and restoration" while apparently ignoring the very important question of "whether or not mineral and energy resource development by strip mining should be allowed at all on certain areas". For some areas, other uses including recreational uses, can be shown to possess real and intrinsic value to Albertans. The benefits from these other uses may be equal to or perhaps greater than the "benefits" which may accrue to Alberta from exploitation of subsurface mineral and energy resources.

We have chosen to discuss the "question of uses", ignoring for the time being, the question of "reclamation and restoration". This does not imply that we believe there to be no problems in the areas of reclamation and restoration rather, we believe the first priority is to define those lands within our province where exploration and exploitation of the mineral and energy resource may be incompatible with continuing use of the surface resources. Where conflict is apparent, the fate of the land should be decided only after public debate, and on a logical, rational basis. All benefits and costs that may accrue from resource exploitation must be considered against the benefits (both current and potential) and costs of other uses (including recreational) to which the land may be put. Benefits and costs should include not only those of an economic nature, but also those of a social nature. Each land area must be considered on its own merits. The decision should take into account not only short term costs and benefits, but also those of a long term nature such as those which will affect our children and their children.

We are aware of the statement put forward by Alberta's Dept. of Environment on the "philosophy, concepts and principles" around which legislation on surface reclamation will be developed and are in general agreement with the proposals and conclusions reached within this statement.

However, we believe that greater emphasis should have been placed on the possibility that other resource uses, including recreational uses, must be considered as alternatives to exploration, development and operation of extractive industry.

At the present time we do not have a clearly defined and sound land use policy nor do we have within government a mechanism whereby the benefits to the public which may accrue from one or another form of resource use may be "weighed in public". Because of this the Alberta Wilderness Association requests in fact, pleads for, a moratorium on any new coal development projects within the foothills and mountain regions of Alberta. This moratorium must include those forms of exploration which would involve the building of access roads or the creation of other forms of surface disturbance if the area in question is currently roadless, possesses wilderness or wildlife attributes, or constitutes a critical grazing range for native species of large mammals. The moratorium should remain in effect until such time as the provincial legislature can present to the public a clearly defined and sound policy with regard to land use in the foothills and along the eastern slopes of the Rocky Mountains.

Such a policy should be preceded by draft proposals which will be subject to public hearings and discussion.

Beginning now, well before presentation of such a land use policy to the public, the Dept. of Lands and Forests should begin an immediate inventory of all lands within the province that might qualify as scientific or recreational wilderness areas. For inventory purposes "wilderness" should be defined broadly, and the presence of man's work need not be a disqualification at this early stage. Within the proposed land use policy should be allowances for the setting aside of wilderness areas for recreational and scientific uses, recognizing that man's use of an area as "wilderness" precludes other uses. The sole use of a specific area for wilderness could however, be part of a "multiple-use" plan for a region. Other recreational uses may well be compatible with resource development including certain uses normally associated with "wildland" if said development is executed with care, public access is well regulated and in certain cases limited, such as "access by motorized vehicles prohibited".

Planning such as this might allow Albertans to "have their cake and eat it too". Thus coal development would be allowed, but only in certain well defined areas, these areas having been chosen on a logical and rational basis after being subject to public debate and discussion. Where allowed, such activities would of course take place with protective features that insure minimum land and watershed disturbance in order to afford the maximum protection to our fish and wildlife and other recreational resources.

Given then, the need for such a "Land Use Policy" we would like to discuss in some detail the basis on which policy-making decisions should be made. One important factor will be the market for Alberta coal. The volume of coal currently being mined in Alberta is approaching 10 million tons per year. This magnitude of development is negligible in comparison to the possible development which could occur over the next twenty five years. It may not be unrealistic to anticipate a 5 to 10-fold increase in production rates during this period. Ultimately the value of coal produced in Alberta could exceed the value of oil presently being produced. Guidelines established in the next several years will have a profound effect on the environment and the future well being of Albertans.

Even at a production rate of 100 million tons per year Alberta coal reserves are estimated to be adequate for 500 years. We do, however, recognize that the economics of extraction currently limit the use of all but a small portion of these immense coal reserves. However, we believe that every effort including the expenditure of research monies, be made to more intensively mine those areas already committed to development before authorizing any new developments.

Adequate environmental controls could more effectively be established and could be carried out more economically. A needless proliferation of development sites must not be allowed. The fact that an industry has already spent monies on exploration of an area should under no circumstances be considered an argument for development in said area. Rather, it is preferable that the company be reimbursed from the public treasury than an initial mistake be compounded. We are aware of the complex situation involving the mining and transportation of large volumes of material such as coal, and recognize that in the past public subsidies have been used, especially in the provision and maintainance of transportation facilities. We would consider the use of public monies in the future for the development of transportation facilities to new sites to be an unwise and even immoral use of public funds. Rather, if subsidy is to be given to the industry, it should be an open subsidy and should be applied to the areas currently under development so that more intensive mining may be used to meet the market needs.

It is ridiculous for Alberta to allow, much less encourage, the initiation and development of new mining locations within the foothills and mountain regions if intensification of mining at sites presently under development is feasible. If the costs and benefits of proposed coal developments are to be weighed against the costs and benefits of other land uses in making policy decisions, the public and government will need to have additional information made available. Just what are the economics of development for an extractive industry such as coal mining? What portion of the capital investment goes to machinery made outside of Alberta, or even outside Canada? How many new jobs are made available to Albertans for each dollar invested capital? What is the economic multiplier factor for extraction and transportation labour relative to other industries which might exist in lieu of coal mining, such as the lumbering, grazing, and recreation industries? Will the initial or maintainance cost of transportation facilities require subsidy by the taxpayer? Can the industry truly make a profit if damage to the environment of adjacent areas and reclamation costs of the mined areas (estimated by some to be in excess of $5,000 per acre for adequate restoration) are internalized? These are not moot questions and the answers to these and other contentious questions must be provided before policy decisions are made.

The Alberta Wilderness Association has extreme reservations with respect to strip mining within the mountainous river headwater areas. The deep winter snow accumulations are the source of the summer flow in most of our prairie river systems. The soil and vegetation cover are highly susceptible to any physical disturbance. Consequently, when even a small portion of an upland is destroyed the resulting effects are often far out of proportion to the area initially disturbed. While chemical changes in the water may not be as critical as they are in mining operations in eastern North America siltation of streams and lakes from access roads, the mining operation itself, and washing operations are detrimental factors of mining operations. The costs of these factors must be borne in mind when weighing the benefits of resource exploitation against other land uses.

Isn't it true, that on the eastern slopes of the Rocky Mountains those areas possessing seams of coal readily accessible to strip mining are also the most productive ranges, summer and winter, for Alberta's bands of mountain sheep and goats, as well as elk and other wild game. Destruction of this habitat, coupled with increased hunting and poaching pressures that accompany easier access threaten the very existence of these species as a renewable recreational resource. Aesthetics aside, how much is each big game animal worth to the economy of the province? These figures should be available when land use policy decisions are made. Not only will habitat destruction be a factor, but in the case of elk, the location of at least one potential site for strip mining and an adjoining townsite would disrupt the normal winter migration from Banff National Park to their winter grazing areas (Panther River area).

We think that our government should recognize more fully that financial returns to Albertans from recreational use of public lands by non-resident visitors is rapidly increasing. Approximately fifty per-cent of the total expenditures by non residents in Alberta comes from the visitor whose purpose is pleasure. Although a large number of these visitors come to visit the National Parks, the capacity of the parks to accommodate them is limited, and would appear to be reaching its capacity. Alberta's other public lands will undoubtedly come under increasing pressure to provide recreational opportunities for the non-resident visitor. Is rampant exploration and indiscriminative establishment of strip mines in the foothill and mountain regions conducive to, or compatible with, this other industry? We think that our provincial government should face up to the fact that tourists do not come to Alberta to spend their vacations on seismic trails or coal exploration roads or to view strip mines. It is the wilderness, or whatever remains of it, that attracts most of our pleasure seeking visitors. They can see enough indiscriminate industrial exploitation in their own home provinces or states, they do not need to journey to Alberta for that experience. We recognize that most of these visitors do not utilize Alberta's wilderness directly (it could not stand the pressure, yet re-create in our country which ranges from the prairie to the foothills stream, mountain ridge and valley. Remove the "wilderness extreme" from the picture and you remove, we think, a large part of the thrill and pleasure of expectation of every visitor who comes to Alberta for a "wildland" experience. Yet removal indeed will be the end result if we continue our present patterns of resource exploration and exploitation.

A number of things point to tourism in Alberta increasing. The four day work week, lowered airfares, increasing mobility of America's working class. These will be urban tourists escaping to Alberta from the daily pressures of their man-made city environment to the natural environment of Alberta. Will our prairie, foothill, and mountain regions be able to provide the type of recreational experience that they, and even our own urban residents need? Definately not, if resource exploitation continues its relentless march up every valley and over every ridge. We believe that a good case can be made for considering the recreation potential of our undeveloped wildlands as an economical alternative to resource development in much of our foothills and mountain areas. There is no excuse for ignoring this potential in making land use policy decisions.

In conclusion, then, the Alberta Wilderness Association believes that the economic benefits and costs which accrue to Albertans as a result of coal exploration and strip mining operations should be carefully reviewed. If the long term benefits of this form of resource exploitation do not clearly outweigh the costs, both social and economic, and if alternative non-destructive land uses will provide in the balance, reasonable economic benefit with fewer real and social costs, then there is no justification for strip mining activities. One of the alternatives of land use which may be appropriate is the establishment of wilderness recreation areas. Given a proper system of zoning for adjacent areas, the preservation and conservation of wilderness areas for recreational use will, in our opinion, often provide the greatest social and economic benefit over the longest period of time to the greatest number of Albertans. This potential benefit should not be sacrificed for the short term benefits which might possibly arise from any other resource development.

We believe that sound long term land use policies must be forthcoming from the provincial legislature and that these policies should reflect the true needs, priorities, and wishes of the people of Alberta. We await presentation of these policies for public debate with anticipation.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

In your presentation you treated the foothills and the mountain regions together. Do you see any substantial difference in the sensitivity of these two areas for strip mining approaches?

MR. W.J. DITCHBURN

None whatsoever. They are both much the same in regards to strip mining.

5.9 THE EFFECTS OF MINING IN MOUNTAINOUS AREAS OF ALBERTA

PRESENTED BY ELMER KURR

Gentlemen:

The effects on the environment by resource development is of great concern at this time even in remote regions of the north where few people live or where few people possibly will ever live.

The mountain area of Alberta under provincial jurisdiction and particularly that portion which is part of the east slopes and adjacent to the main population belt, warrant concern amplified many times in comparison to remote northern areas.

Our mountains might well be compared to a secret retreat, and anything that occupies or will expose that retreat will destroy its values as a retreat.

This brief will therefore deal with the use of mountain areas by any large scale mining operation that will require roads or railway to remove the resource, or that will create a population centre other than in presently established travel corridors.

There is an apparent awareness that mining operations can cause irreparable damage to the environment by pollution and destruction of the natural values by surface disturbance. It must be made equally apparent that reclamation of most mountian areas is in fact impossible, that reclamation of the surface as such, is a minor consideration if that term is to be applied to our Alberta mountain region and its natural attributes.

The demands for energy fuels and profit on such public owned property must be equated to the long term values and justify that position tomorrow - for tomorrow our judgement will be far more severe.

Alberta for too long has developed the east slopes program of resource use on the multiple use concept. The multiplier effect of this policy will inevitably destroy the natural values and thus the continued enjoyment of the traditional uses unless, this region is zoned as to what resource use will be allowed. Each projected type of use must be judged not only on its individual effect on the peoples use of the area but also on the pyramid effect when combined with other commercial uses of an area.

It would appear that a given area or zone could allow development of its oil because of the nature of its development as opposed to the incompatible nature of coal mining. The differences being that an oil well can be drilled in a very short time by very few people using existing roads and then leave, while a mine in fact becomes a settlement of people and noisy machines for long periods of time.

Requirements of such settlement and its demands for roads and services are additional burdens on society when in fact the area has been already monopolized by that settlement to the detriment of the traditional peoples use.

The panic to develop all our resources in our lifetime or the farce that such development is needed to create employment are not justifiable reasons for exploitation of our limited mountain region. The fact that coal mines in our mountain areas are mostly foreign owned and not economical are probably less important to Albertans then the fact that such exports are occupying more and more of our trade balance with certain countries, trade that should be made up of foodstuffs, the one thing which we are producing economically as well as involving large inputs of labour and materials.

In conclusion, I respectfully suggest the zoning of mountain areas to restrict development and particularly prohibit mining west of the first range other than in established travel corridors.

DICKSON FISH AND GAME ASSOCIATION

PRESENTED BY MR. HARRY JENSEN

5.10 To. THE ENVIRONMENT CONSERVATION AUTHORITIES.

Nature has been kind to us. It has been kind to Albertans, but we feel it's response will have it's limits. We feel it cannot stand the massive onslaught of man's depravity, unless man himself learns to respect the laws of nature and to live within it's limits. Therefore we feel one of the most important issues facing mankind today is his Environment. Man is becoming well aware of the pollution of our environment, the air we breathe, the water we drink and the soil that grows our food. We hope all citizen's, all sportsmen are concerned with what is happening to our tree's, river's, lake's, streams, our mountains, our wildlife, our citie's and town's, our outdoor's, our environment in general. We must renew our renewable resources, we must preserve our wildlife, fish and trees. We feel Industry must be made to keep their "poisons" to themselves. This Association feels upmost attention should be given to the reviewing of our laws governing the development, use and management of our natural resources to ensure their adequacy and consistency.

A critical problem facing Alberta today is, what will the outcome of land development in our rural fringes and Rocky Mtn. forests be? Here legislation encourages action, which are not necessarily consistent with the best land use for our environment. Cattle grazing in the Rocky Mtn. forests surely is not necessary, nore are they helping the environment. The over-riding power of mining legislation enabling minerals, coal etc. exploration in places where this may not necessarily be wise, we feel we need positive legislation for the proper assessment of our resources and land uses.

Do we need all our resources extracted today? What about tomorrow?

We beleive many people in this province and Canada are convinced that there are some things that cannot be valued in terms of dollars and cents. They have infinite value to the community, to each living person, each living thing.

Either you have them, or you do not have them, because you have destroyed them.

All together these living and life related resources make up a natural whole, they are interelated. They are mutually self-sustaining. They must be managed and they must be guarded very closely. In addition to this, we feel they must be operated on a sustained yield basis.

Therefore in conclusion we urge this Environmental Committee to recomend to the Provincial Government to stop exploration of coal, oil and gas in our Rocky Mtn. forests before we lose our natural heritage.

Also one large step toward an improved environment would be the removal of the domestic cattle from the Clearwater and Red Deer river valleys.

Let Alberta lead the way toward a better environment.

Harry Jensen
Dickson Fish & Game Assn.

5.11

ABCON ENGINEERING (ALBERTA) LTD.

Calgary, Alberta.

SUBMISSION
TO THE

ENVIRONMENT CONSERVATION AUTHORITY

SURFACE OR STRIP COAL MINING IN ALBERTA

Presented at
RED DEER, Alberta.
By
W.J. Blackstock, P. Eng.

January 6, 1972

ABCON ENGINEERING (ALBERTA) LTD.

SUBMISSION TO THE
ENVIRONMENT CONSERVATION AUTHORITY

SURFACE OR STRIP COAL MINING IN ALBERTA

Introduction

Mr. Chairman, Members of the Authority, Ladies and Gentleman, my name is Bill Blackstock and I am a coal mining consulting engineer, I appreciate this opportunity to speak to you on the matter of Surface Mining in Alberta. I have spent my whole life in Alberta, and since leaving the Royal Canadian Navy in 1945 I have been coninously involved in every aspect of open pit strip coal mining in Western Canada. My involvement includes exploration, development, production and management of prairie strip mines producing sub-bituminous coal, foothills strip mines producing sub-bituminous and bituminous coal, and mountain strip mines producing bituminous steam and coking coal. I have worked in almost every coal area of Alberta, Saskatchewan and most of those in British Columbia at one time or another and have been involved in one way or another in the exploration, development or operation of almost all the strip coal mines now operating in Alberta today. Since 1945 I have seen the almost complete phase out of the higher cost underground coal mines producing sub-bituminous coal on the plains in favour of the highly mechanized low cost strip coal mines producing large tonnages of sub-bituminous coal, and the phase out of the foothills and mountain coal mines producing mostly bituminous coal for boiler fuel for the Canadian railway companies. More recently I have been involved in the exploration for large tonnages of low volatile bituminous coking coal reserves, to be developed to produce by strip coal mining methods, large tonnages of bituminous metallurgical coking coal for export to Japan.

I was involved in the reclamation discussions in 1951 when the first regulations for the protection of the environment in regard to strip coal mining were formulated by the Government of the Province of Alberta.

I was present at your recent hearing in Calgary and was surprised to find that there is a great deal of hysteria connected with some of the submissions and allegations made before you in regard to open pit or strip coal mining in Alberta, and for this reason I thought that it would be timely and appropriate to come before you at this hearing and try to set the records straight, to speak up for the strip coal mining industry in Alberta and to present my views to you.

History of Strip Coal Mining in Alberta.

The first strip coal mines in Alberta were very small and consisted for the most part of openings in cut banks and in river valleys where the coal seams were exposed and mined in a small way to produce coal for the local farmers. The production from these mines was very limited.

The first commercial strip coal mine on the plains was opened up at Tofield, Alberta prior to 1911 and it operated up to 1957. It produced sub-bituminous coal for domestic use. This strip mine was owned by Mr. Claud Gallinger who was also a noted cattle rancher. He reclaimed the worked out mine pits and dump areas and seeded them back to pasture to be grazed by his own cattle.

The first commercial strip coal mine in the foothills was at Sterco, Alberta. It produced bituminous coal for railway boiler fuel. It was opened up by Sterling Collieries Ltd. in 1918 and operated continously until 1951 when it was closed due to the loss of its market for coal when the Canadian National Railway converted to diesel locomotives.

Prior to 1940 very few strip coal mines were operating in Alberta. In addition to those mentioned above a strip mine was opened on the plains at Sheerness, Alberta in 1934 producing sub-bituminous coal for domestic use and is still operating, but producing coal for electric utility boiler fuel only. A strip coal mine was opened up adjacent to Sterling Collieries Ltd at Sterco, Alberta by Coal Valley Mining Company Ltd. during 1922 to produce bituminous coal to be mostly used as boiler fuel by the railways. In 1951 these two mines Sterling Collieries Ltd and Coal Valley Mining Co. Ltd. were amalgamated into one mine under the name of the Sterling Coal Valley Mining Co. Ltd. and the combined operation was closed down in 1954 due to lack of markets for their coal when the Canadian Railways converted from coal fired steam locommotives to diesel locomotives.

The major expansion of strip coal mining activity occured as a result of the extreme shortage of coal in the early part of the Second World War. In order to rapidly increase porduction of all ranks of coal the Dominion Government established the Wartime Emergency Coal Production Board to control and increase the production of coal in Canada. This board with the assistance and the direction of Mr. G.A. Vissac a well known coal mining engineer financed and opened up a number of sub-bituminous and bituminous coal strip mines in Western Canada. The additional coal produced by these strip coal mines together with the coal produced by the existing mines was sufficient to meet the increased demands for coal of Wartime Canada. These strip coal mines continued operating after the end of the war due to their low cost, high production capability in a period when there was a definite shortage of experienced coal mine labor.

The mining of the flat lying coal seams on the plains lent itself to strip coal mining very well. High production, mechanized strip mines with very low costs flourished and increased their production at the expense of the higher cost underground mines producing sub-bituminous coal for domestic and industrial use. The discovery of oil at Leduc, Alberta with the further discoveries of oil and natural gas provided a premium fuel to compete with coal for the domestic and industrial market. Natural gas supplied most of the domestic fuel and the competition for the remaining coal markets by the low cost strip coal mines caused most of the underground mines to close. The strip coal mines increased their production to supply the existing remaining domestic and industrial market and at the same time they interested the power producing utility companies in Alberta into building coal fired thermal electric generating plants on the coal fields as mine-mouth power plants. Most of the sub-bituminous coal now produced by strip coal mining methods is used in mine-mouth power plants as boiler fuel. In 1970 there were 3,920,206 tons of sub-bituminous coal produced in Alberta of which 3,825,815 tons or 98% was produced by strip coal mining methods and of this in excess of 3,200,000 tons of coal was burned in the boilers of the Alberta electric utilities coal fired electric generating plants. These utility companies burned 81% of the sub-bituminous coal produced in Alberta in 1970.

The future for the plains strip coal mines lies in supplying the needs of the Alberta electric utility companies increasing amounts of power plant fuel. The power load in Alberta is growing at a rate in excess of 10% per year and almost all this additional energy will be supplied by coal fired thermal electric generating stations. It is estimated that the Alberta electric utility companies will be burning in excess of 10,000,000 tons of sub-bituminous coal by 1980 and all of this will be produced by strip coal mining methods.

The bituminous coal mining industry expanded its production from 3,069,197 tons in 1940 to 3,923,849 tons in 1944 when for the first time strip coal was produced and when some 119,092 tons of coal were produced by strip coal methods. In 1949 the peak year for the production of bituminous coal 5,495,327 tons were produced of which 1,914,463 tons or 35% of the total production was produced by strip mining methods. After 1949 the production of bituminous coal was reduced due to the loss of the railway boiler fuel market when the railways converted to diesel locomotives. The production of bituminous coal in Alberta continued to decline until in 1962 only 590,139 tons were produced. By 1970 due to the export of metallurgical coking coal to Japan, the production of bituminous coking coal in Alberta had increased to 2,863,705 tons, of which 909,462 tons, or 32%, was produced by strip coal mining methods. It is estimated that the production of bituminous coal will be 5,500,000 tons in 1972, almost all of which will be shipped to Japan as metallurgical coking coal and 2,400,000 tons, or 44% of it, will be produced by strip coal mining methods.

It is felt that the production of Alberta bituminous coking coal for the Japanese market will increase in the near future if mining conditions are maintained such that the cost of producing this coal is kept competitive with bituminous coking coal that is alternatively available to the Japanese from other countries around the world and that by 1980 the production of metallurgical coking coal will be 10,000,000 tons per year, all of which will be exported to Japan or other overseas countries.

Strip Coal Production in Alberta

The coal reserves in Alberta are located on the plains, in the foothills and in the mountains, and range in rank from lignite found in the south east corner of Alberta, to sub-bituminous coal found on the plains and in the foothills, to bituminous coal found in the foothills and mountains along the western side of the province, and semi-anthracite coal found and mined at Canmore, Alberta.

Coal strip mining first started in a small way in Alberta about 1870, when coal outcrops along the Oldman River near Lethbridge were mined and coal mining increased until 1949, when the total sub-bituminous and bituminous coal production in Alberta was 8,616,983 tons. This was made up of 3,121,656 tons of sub-bituminous coal, of which 1,027,493 tons were produced by strip mines and used for domestic heating and for small commercial boilers, and 5,495,327 tons of bituminous coal, almost all of which was used by the Canadian railways as boiler fuel and of which 1,914,463 tons, or 29%, was produced by strip coal mining methods.

The discovery of oil and gas at Leduc in 1947 had a marked effect on the production of coal in Alberta. It resulted in the conversion of homes from coal-fired heating facilities to natural gas or oil-fired equipment and the conversion of the railways from coal-fired steam locomotives to diesel locomotives. The result of these changes was that the production of bituminous and sub-bituminous coal dropped off very markedly and the high cost underground coal mines had to be abandoned in favour of the lower cost open pit or strip coal mines.

Many underground coal mines closed as a result of the intense competition from the strip coal mines. By 1962 the coal production had fallen to 590,139 tons of bituminous coal, of which 518,033 were produced by two mines shipping the bituminous coking coal to Japan. Strip coal mining methods produced about 20% of the bituminous coal mined.

In 1962 1,497,171 tons of sub-bituminous coal were produced, of which about 510,000 tons or 34% was used as power plant fuel by Calgary Power Ltd. and Canadian Utilities Ltd. to generate elecrical energy, all of which was produced by strip mining. Strip coal mining methods produced 1,039,757 tons or 70%, of the sub-bituminous coal produced in 1962.

Coal production since 1962 has gradually increased to 1970, when 3,920,206 tons of sub-bituminous coal and 2,863,705 tons of bituminous coal were produced. Strip mining methods were used to produce most of this coal. There were 3,825,815 tons, or 97%, of sub-bituminous coal produced by strip mining, of which some 80% was used as power plant fuel by Alberta power-producing utility companies. There were 909,462 tons, or 32%, of bituminous coal produced in Alberta by strip coal mining methods and almost 100% of this was shipped to Japan as metallurgical grade coking coal.

In 1970 the total Alberta coal production was 6,783,911 tons and of this, 4,735,277 tons, or 70%, was produced by strip coal mining methods. The production of coal by strip coal mining methods will increase in Alberta to the point where almost all of the sub-bituminous coal and most of the bituminous coal will be produced by this mining method.

It is estimated that in 1972 the total production of bituminous and sub-bituminous coal in Alberta will increase to 10,700,000 tons. There will by 5,500,000 tons of bituminous coal produced, of which some 2,750,000 tons, or 50%, will be produced by strip coal mining methods. Almost all of this coal will be shipped to Japan as metallurgical grade coking coal.

There will be 5,200,000 tons of sub-bituminous coal produced, of which 5,100,000 tons, or 98%, will be produced by strip coal mining methods. About 5,000,000 tons, or almost all of this coal, will be burned in the boilers of the coal-fired electrical generating plants of the Alberta electrical utility companies to produce electricity for our convenience.

It is estimated that by 1980 coal production will be 20,000,000 tons, made up of 10,000,000 tons of bituminous coking coal, of which 50% will be produced by strip coal mining methods, and 10,000,000 tons of sub-bituminous coal, all of which will be produced by strip coal mining methods. The increasing demand for electrical energy in Alberta will assure that the production of strip coal will keep increasing beyond 1980.

It is estimated that the revenue the coal mines will receive in 1980 from the production and sale of coal will be in excess of $80,000,000.00.

Strip Coal Mining Methods in Alberta

The method of recovery of coal in Alberta by open pit or strip mining procedures varies a great deal depending on the conditions governing the particular reserve of coal to be mined. Coal is found on the plains, in the foothills and in the mountains of Alberta and, in each case, the conditio as to the rank, thickness and attitude of the coal and the type and attitude of the overburden require different mining techniques to recover the coal economically.

The following is some general information with respect to the production of coal from various areas in Alberta:

The Plains Strip Coal Mines

The coal seam in the plains area is usually of uniform thickness, flat lying, sub-bituminous coal, overlain with clays and shales and easily strip mined in large tonnages by large modern mechanized equipment.

Exploration is usually fairly simple. Test holes are drilled into the coal and cores or chip samples are taken. Very little surface damage is done since most areas are easily accessible by municipal roads or through farmers' fields.

The most important pieces of equipment in plains strip mining are the large dragline and large power shovel which are used to excavate the overburden overlying the coal seam.

In order to begin a strip coal mine the first cut or box pit is opened up and the overburden is placed on the original ground in the waste area. The coal is removed from the box pit and the overburden excavated from the subsequent cut or pit is dumped into the first cut or box pit. The second and subsequent cuts or pits are called the turnover cuts or pits and the procedure for the waste disposal is the same. The area into which the overburden is dumped, due to the way that the shovel or dragline disposes of the overburden, is left as a series of consecutive parallel hills and valleys as the strip coal mining proceeds. The final reclamation of this waste area should involve making it at least as productive as it was before the coal strip mining took place.

The construction of haul roads is usually very simple and they can easily be rehabilitated when the coal mining is completed.

Excess water that accumulates around plains strip mine workings in Alberta is usually chemically neutral, neither acid nor alkaline.

Foothills and Mountain Strip Coal Mines

The bituminous coal seams in the foothills or mountains have been distorted and displaced due to the forces that were present during the period of mountain building activity in the past. As a result, we find that the coal-bearing formations may be faulted and folded or displaced, making it difficult to explore for, to find and to mine the coal.

The result of this is that the coal seam varies in thickness along the strike within a short distance and it may be flat lying or standing on its end. Thus the dip may also vary over short distances along the strike. The coal seam may or may not be exposed or outcrop on the surface in any given area. The variable conditions often provide very special situations that lend themselves to economical strip coal mining opportunities.

The topography of the foothills and mountain areas is often very rugged, involving steep cliff-like mountains, deep valleys and difficult rock outcrops that must be traversed. As often as not, the coal seams occur above the tree line, making access very difficult.

Exploration is more difficult than on the plains and, in its initial stage, is carried out by establishing the geology, faults, folds, coal outcrops and the dip or strike by surface investigation on foot or with a helicopter. Some hand trenching is carried out at this time to establish the thickness of the coal seam and its quality.

The secondary exploration stage includes the making of access roads by bulldozer, test trenches excavated by hand or bulldozer, test drill holes with core or chip samples and adits to explore the coal seam underground. It is during this time that the future of the coal prospect is determined.

The foothills and mountain strip mining involves the removal of overburden, usually rock that must be blasted out of and removed from the pit area by trucks and shovels so that the coal can be recovered. This waste rock is usually dumped in an area removed from the pit and is not replaced at a later date.

The combination of the topography and the dip, strike and thickness of the coal seam governs the type of pit to be used in the mining of the coal.

In strip mining the coal, usually one of three types of pit is used, depending on the specific conditions with regard to the location and attitude of the coal seams. The following is a short description of each type of strip pit:

V Type Strip Pit

This type of strip pit is used where the coal seam is dipping very steeply. It is usually a long narrow pit in which the overburden is removed from the pit area in lifts by a shovel loading into trucks which haul the waste rock to a dump area outside the pit. The coal is recovered as each lift or bench of rock is removed. Usually the pit is not backfilled as the work progresses and is left open on the completion of the coal removal. If drainage is not provided, it may fill up with water.

Glory Hole Strip Pit

This type of strip pit is used where the coal seam has been disturbed so that a large volume of coal has been squeezed into one large pocket or where there is an anticline or syncline in the coal seam.

The type of pit involves careful planning and testing to properly locate the extent of the coal seam and to determine the pit slopes. Large volumes of overburden are removed in lifts by shovels and trucks before any coal is recovered. The overburden is removed from the pit to a dump outside the pit area and when the coal is completely removed a large hole is left. Usually drainage is provided but, if this is not possible, the water will form a lake in the completed pit. An example of this is at Coal Valley where the lake is full of fish.

V Type Strip Pit on Steep Side Hill

This type of strip pit is located on a steep side hill and access becomes very difficult and must be planned so that the overburden from each lift can be disposed of outside the pit area. The coal must be removed before the subsequent lift or excavation is removed or it cannot be reached. Excavation is removed by shovels and trucks from the pit area.

Access to the pit must be provided by a road to each lift or excavation so that planning and road making are very important in this type of strip mining. The pit is left open ended and because of the grade on the pit bottom will drain without any difficulty.

It is quite evident from the above general description of these strip pits that it will be very difficult and costly to restore the ground in such strip pits to its original contour.

Reclamation should consist of re-seeding, tree planting and utilizing the pits for fish ponds by letting them fill up with water and stocking them with fish.

Employment of Personnel in Strip Mines

There has been a great deal of criticism and discussion at the various hearings that have been held in regard to the limited number of men employed in the mines producing strip mined coal. For the most part people with little or no experience have been making statements to the effect that more men would be employed if all the coal was produced by underground mining methods. This is probably true if we could find the men to go underground and find markets for our high cost underground coal. Even the few underground mines that are now operating are finding it very difficult to get enough miners to operate their mines at full production.

Utilizing the annual report of the Mines Division of the Department of Mines and Minerals for the year 1970, we find that the productivity of a miner employed in underground coal mining and strip coal mining is as follows:

Bituminous Coal Mining	Tons Coal per man year	Tons Coal per man shift
Underground Mining		
Cascade area (old mine)	1078	4.56
Crowsnest area (old mine)	1412	5.99
Smoky River area (new mine)	2261	11.33
Average	1695	7.68
Strip Mining		
Cascade area	5003	16.10
Crowsnest area	6606	28.48
Mountain Park area	3815	18.48
Average	4290	20.08

From the foregoing data, it can readily be seen that the productivity of a man underground in a bituminous coal mine is much less than for a man in a strip coal mine.

These figures indicate that it would take up to five men in an underground mine to produce the same amount of coal as one man can produce in a strip mine under certain conditions. Assuming an average production of bituminous coal in Alberta, a miner in a strip coal mine will produce almost three times as much as a miner in an underground mine in the same time.

Sub-bituminous Coal Mining	Tons Coal per man year	Tons Coal per man shift
Underground Mining		
Drumheller area	1012	8.14
Edmonton area	1062	4.98
Average	1026	6.86
Strip Mining		
Drumheller area	1948	15.62
Edmonton area	3796	15.82
Pembina area	16890	90.05
Castor area	10864	47.57
Sheerness area	10271	43.60
Average	12753	62.15

The above data readily indicates that production of a miner underground in a sub-bituminous coal mine is much less than that of a man in a strip coal mine. These figures indicate that a man in a sub-bituminous strip coal mine producing large tonnages of coal for a thermal electric power plant can produce up to 11 times as much coal per day as can a miner in an underground mine. This same miner in a very small strip mine will produce almost twice as much as his brother in a small underground mine in the same area. The range of productivity of a miner in favour of strip coal mining sub-bituminous coal in Alberta is from two times to eleven times as effective, with the average productivity being nine times as effective as a miner in an underground mine.

Assuming that by 1980 the production of bituminous coal will increase from the present figure of 5,500,000 tons per year to 10,000,000 tons per year and that the production of sub-bituminous coal will increase from 3,900,000 to 10,000,000 tons per year in the same time, in order to maintain the supply of coal the number of miners needed to do this is as follows:

Bituminous Coal	Production Yearly Tons	Production Man Year Tons	No. of Men	
Underground Mining	10,000,000	1695	5900	
Strip Mining	10,000,000	4290		2350
Sub-bituminous Coal				
Underground Mining	10,000,000	1026	10000	
Strip Mining	10,000,000	12753		800
Total			15900	3150

Thus we see that to produce all the coal by underground mining methods would require some 15,900 miners by 1980, while if this same 20,000,000 tons of coal were produced by strip mining methods, some 3,150 men would be required. This labour situation is somewhat distorted and the true condition is likely to be that about half of the bituminous coal would be produced by underground mining methods, requiring some 3,000 men, and the other half by strip coal mining methods, requiring about 1,200 men, for a total of 4,200 men.

Almost all the sub-bituminous coal, which will be used as boiler fuel, will be produced by strip coal mining methods and approximately 800 will be employed in the industry. Thus a total of 5,000 men will be directly employed in the production of 20,000,000 tons of bituminous and sub-bituminous coal in the Alberta coal mining industry by 1980.

The problem of finding enough men to mine the coal is a very difficult one to solve, especially in regard to underground miners. Even now, when only 1,000 underground miners are required, it is almost impossible to find men who will go underground to mine coal. This problem will be aggravated by 1980 when the trained underground labour force will have to be 3,000 men.

Assuming that the foregoing figures are substantially true and utilizing the figure of 2.7 men employed outside the mine to support each miner, submitted to the hearings in Calgary, the coal mining industry in Alberta will be supporting some 18,500 families by 1980, not including the increased number of officials, inspectors, etc. that the Government of Alberta will have to provide to regulate and control the coal mining activities.

Reclamation in Strip Mines

In listening to the submissions made by various members of the press and the public, one would be led to believe that the coal mining industry was completely irresponsible in the matter of reclamation and pollution. I would like to point out that there were regulations in regard to strip mine reclamation and pollution laid down by the Department of Mines and that these were enforced by the Mines Inspectors and followed by the coal mine operators. However, now that pollution and reclamation have become fashionable occupations, the strip coal mine operator is held up as the great desecrater of the landscape and one who is bent on destroying the plant life, the wild animals, polluting the ground and surface water and destroying for ever the natural environment in which we now live. Nothing is further from the truth. These coal mine operators are as concerned about the environment as most of the concerned individuals submitting briefs to your hearings. They have had to adhere to the regulations laid down and administered by the Department of Mines and should not be criticised, harassed and threatened because these regulations, although adequate at the time, are now considered to be outdated, ineffectual and not tough enough by some groups riding on the crest of the present hysteria for the protection of the environment.

In 1952 the coal mine operators formed the Alberta Reclamation Association and, together with the government agencies involved, assisted in drawing up a set of regulations that covered the requirements at that time for strip mining land reclamation and pollution problems that were present in the Alberta strip coal mining areas and it dealt properly with the conditions peculiar to Alberta. To this date I do not know of any case of reclamation or pollution contrary to the regulations in force that has not been properly rectified to the satisfaction of the Department.

There have been many briefs predicting the dire things that will happen and they mention the acid water situation of the high sulphur coal mines in Tennessee, a situation which does not apply to our low sulphur coals. They also mention the lack of land reclamation on the plains as well as reclamation in the mountains and other dire things with regard to the plant and animal life but fail to give the coal mine operator credit for living up to the regulations that were in force at the time that the coal was mined and the strip pits made during the last 60 years of strip coal mining activity.

Regulations as to land reclamation and use of natural resources should be made to apply to the special conditions that exist at any time. In all cases we should aim at getting the maximum use of our natural resources. We should not destroy a valuable resource such as timber, gravel, sand, water, etc. in order to recover another equally valuable resource such as coal or oil. Mining and operating techniques can usually be set up so that the destruction of valuable and irreplaceable resources is not necessary. However, the value of the resource and the ultimate value of the reclaimed land should be a consideration in any reclamation programme and heavy expenditures should not be made to rehabilitate land that has little or no commercial value.

Regulations regarding coal exploration, coal development and coal mining should be clearly defined and easily understood, so that it does not require a committee made up of experts from four or five government departments to review each case in point and determine the exact meaning of the regulations and the procedure to be used. The committee method of determining exploration and mining procedures by persons inexperienced in the particular technique creates impractical decisions, costly delays and additional expense to the coal mine operator. The decision and planning of how to do the specific job of exploration and coal mining within the regulations should be lèft up to the operator himself, subject to inspection by the appropriate inspectors. This will ensure a minimum of delay and a programme developed by a person who is familiar with the conditions and competent in this particular area of expertise in regard to the coal mining industry.

Conclusions:

In reviewing strip coal mining in Alberta the following points are submitted for consideration by the Authority:

1. The strip coal mining industry has a bright future and will increase coal production to everyone's benefit if regulations and administration concerning ecology, reclamation and pollution are not too oppressive and expensive to carry out.

2. A great number of new jobs will be created through the increase in coal production by strip mining methods in the next eight to ten years.

3. The conservationists who recommend no strip coal mining or a reduction in strip coal mining represent a very minority

group which would like to impose conditions on the mining industry that would adversely affect all the people by increasing their power costs and reducing their opportunity for employment. It is the government's duty to see that a minority group does not impose its will on a majority group and adversely affect that group's best interest and welfare.

4. In the period up to 1980 the injection of the capital necessary to get coal production in Alberta up to 20,000,000 tons per year will be of the order of $200,000,000.00, which will produce a significant annual tax income for the provincial and municipal governments.

5. The production of 20,000,000 tons of coal per year will create an annual revenue of a minimum of $80,000,000.00 per year for the coal mining industry of Alberta and this will increase as coal production increases.

6. The Alberta electric utility companies will continue to increase their use of sub-bituminous coal for boiler fuel because the cost per B.T.U. for utilization of coal is substantially less than the cost of any other competitive fuel.

Recommendations

I have reviewed strip coal mining in Alberta in a limited way to bring to the attention of the Authority the importance of this part of the coal mining industry and to speak on behalf of myself in regard to the many threats of dire consequences that the public at large has associated with the industry due to the criticism voiced by many who, in some cases, appear to be poorly informed. Considering what I feel is to the best interest of all concerned, I make the following recommendations:

1. That regulations be set up so that they can be easily understood and that coal exploration, development and mining operations can be carried on with a minimum of delay and harassment by the public at large.
2. Keep the regulations flexible enough to provide for the variety of conditions found in mining coal on the plains, in the foothills and in the mountains.
3. Give authority to competent knowledgeable people who understand strip coal mining to supervise the application of the regulations and to administer them. Decisions should be made with a minimum of delay. The policy of having a committee of so-called learned men reviewing each application should be abandoned in favour of direct application to a responsible authority capable of giving an immediate decision. The Minister should not have to waste his valuable time, that can be better spent on other more important business, reviewing applications to explore for or develop a coal mine or in signing out the letters involved in giving or refusing permission to do this work.

4. The Right of Appeal should be incorporated into the regulations so that the operator may have the opportunity to go before a Board to be composed of, say, two engineers or coal operators, two members of the departments concerned and two persons from outside the industry, one each from a rural and an urban area, to have his case heard and passed on by otherwise unbiased people. Appeals should be heard and decisions made with a minimum of delay.

5. The regulations should provide for the recovery of natural resources where one resource is overlaying another and both have value to be considered in any strip coal mining programme. Should one resource have to be destroyed in favour of another, the owners of that resource should be compensated.

6. Unbiased coal mining men of integrity and knowledge should be selected to referee and assist in protecting the environment and increasing the production of coal. The decisions of these men should be backed up by the government and they should not be exposed to harassment by the fickle opinion of the public at large.

7. Right of entry procedures should be established and the owners of surface rights should be heard and compensated for right of entry to their land. If the mine operator and the surface right owner cannot get togethe on a realistic value for the surface right, then the compensation should be decided by arbitration. This compensation should be determined and paid out to the owner before the strip coal mining operation commences.

ABCON ENGINEERING (ALBERTA) LTD.

PRESENTED BY MR. W.J. BLACKSTOCK

COMMENT

MR. W.J. BLACKSTOCK

I would like to mention one or two things in regards to Conclusions. The strip coal mining industry has a broad future, and I am sure the public and miners and people generally recognize this. The operators themselves are interested and concerned about reclamation and are co-operating with all people interested in this matter. The Alberta Utility companies will continue to increase their use of sub-bituminous coal for boiler fuel, and the reason for this is that the utilization of such coal costs substantially less than the cost of any other competitive fuel. For this reason we get power at a much cheaper rate then most people in Canada.

My recommendations are these. I have reviewed strip coal mining in Alberta in a limited way to bring to the attention of the Authority the importance of this product to the coal mining industry. To speak on behalf of myself in regard to dire consequences that the public at large associate with the industry. I feel that regulations should be set up so that they can be easily understood. Thus, coal exploration developments in mining operations could be carried on with a minimum of delay and harassment by the public. The Authority should recommend that they keep the regulations flexible enough to provide for the variety of conditions found in mining coal on the plains, the foothills and mountains. Give authority to competent , knowledgeable people who understand strip mining to supervise the application of the regulations and to administer them.

Decisions should be made with a minimum of delay. The policy of having a committee of learned men reviewing each application should be abandoned in favour of direct application to a responsible authority capable of giving an immediate decision. The Minister should not have to waste his valuable time with such matters as reviewing applications for exploration or development of a coal mine, or signing the letters involved in giving or refusing permission to do this work. The right of appeal should be incorporated into the regulations so that the operator has the opportunity to go before a Board, composed of say, two engineers or coal operators, two members of the Departments concerned and two people from outside the industry, one each from a rural and an urban area, to have his case heard by otherwise unbiased people. Appeals should be heard and decisions made with a minimum of delay. The regulations should provide for the recovery of natural resources where one resource is overlying another, and both have value to be considered in any strip coal mining program. Should one resource have to be destroyed in favour of the other, the owners of that resource should be compensated. Unbiased coal mining men should be selected to referee and assist in protecting the environment and increasing the production of coal. The decisions of these men should be backed up by the Government and they should not be exposed to harassment by the opinion of the public. Right of entry procedures should be established: the owner's surface rights should be compensated for right of entry to their land. If the mine operator and the surface rights owner cannot get together on a viable assessment value then compensation should be decided by arbitration. This compensation should be determined and paid out to the owner before the strip mining operation commences.

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5.12 TO THE ENVIRONMENTAL CONSERVATION AUTHORITY

Dear Sirs:

Where as exploration for coal reserves has been going on in the upper Red Deer river area for the past several years and also just recently in the Ram river and Meadows area, therefore we have become increasingly concerned that this beautiful virgin mountain country will be ravaged and laid waste by the hitherto unscrupulous methods of extracting coal by the stripping procedure.

This whole area is extremely important to the well-being of fair numbers of wildlife, which are already in competition to the limit with cattle and horses in the Red Deer, Clearwater, Ram river and North Saskatchewan drainage systems.

Development of strip mining in this area would definitely be a factor in causing further destruction of their habitat, and the proximity of man and his noisy machines would also result in their being forced back into the park where grazing areas should be occupied by big horn sheep.

BY SAVING WILDLIFE MAN MAY SAVE HIMSELF

Chemical pollution of rivers and streams and increased erosion and siltation are also the by-products of the physical disturbance of the slopes of any hilly or mountainous area.

Esthetic and recreational values must also be given equal consideration as this area is of great importance to the tourist industry, which brings ever - increasing numbers of people seeking relaxation and the enjoyment of clear air, clean water and beautiful unspoiled mountain scenery.

It has been estimated that based on our current rates of use and our current rates of increase, all fossil fuels will be eighty per cent gone in sixty five years. Instead then of rushing head-long into the inevitable devastation and pollution of our environment, let us expand some of our vast knowledge and physical energies to developing a practical way of meeting some of our essential everyday needs, for example;

#1, By producing part of our requirements in the form of organic material which can be grown on soil already developed and on which there is also a surplus of products being produced.
#2, By further study and development of nuclear power and its adaptation to human needs and uses.
#3, By utilizing solar energy and applying it to some of our needs and uses.

These are only a few of the many possible alternatives to the use and ultimate depletion of our non-renewable resources, that we must devise and explore in the next half century or MAN'S existance on this planet will become very uncertain.

We are very concerned that past practices and policies are inadequate for the present and the future and we believe that yesterdays concepts of development and exploitation should be challenged. We must not assume that all development is progress and that all progress is beneficial.

It is also a fact that reclamation of mountainous terrain is extremely costly and difficult or impossible to restore to any semblance of its former features, therefore it is our opinion that any type of development such as strip mining, etc., should be prohibited on the east slopes of the Rockies, where such proposed developments have not yet reached the operational state.

Respectfully submitted

Signed: Harold Rhodes

Chairman Zone 3, Alberta Fish and Game Ass'n

QUESTIONING BY THE AUTHORITY

MR. PAUL BABEY

I would appreciate you elaborating on your suggestion of using the soil to grow organic material.

MR. HAROLD RHODES

It is a well known fact the use of such material does not contribute to pollution such as fossil fuels do, therefore we think that it could be a great benefit to mankind.

DR. WALTER TROST

Were you thinking of raising it for energy purposes?

MR. HAROLD RHODES

Yes. It is known that wheat or grain produces alcohol and alcohol is considered an effective fuel. It does not produce pollution when burned.

BRIEF ON SURFACE MINING & RECLAMATION

PRESENTED BY

5.13

ROY F. McBRIDE

Primitive man made few demands on his environment. His requirements were limited to the food he ate. But he soon realized the advantages of clothing to protect him from the elements. And his cave was more comfortable with a fire. Animals tamed and trained to serve him further increased his requirements. Wind and water wheels added to his standard of living. But it was when James Watt developed his steam engine, in relatively recent times, that man stood on the threshold of a new era of possibility, an era that has led him even to the moon. In the last twenty-five years we, on this continent, have used more energy than was used in the whole world in all previous history, and if our present rate of increase in productivity is to be continued, we will require seven or eight times that amount of energy by the end of this century. It is true that there are those who claim that they want to get off of our world, and go back to the caveman days, but I am certain that the vast majority will not give up the advantages they have inherited. They will continue to seek improvement in their lot, making greater and greater demands on their environment to provide them with the energy necessary to fulfill their desires.

Where will this increased energy come from? Solar energy is still prohibitively costly. Atomic power has failed to live up to expectations, with costs way above estimates, and with seemingly endless delays. Present atomic plants use scarce uranium fueled reactors, and a new generation of breeder reactors that produce their own fuel are still decades away. Even a major breakthrough in their development would leave their practical application on any large scale beyond the year 2000. Few hydro sites are left undeveloped. Reserves of oil and gas are dwindling at a rate that makes their production from coal imperative within the next ten years. Only coal can be counted on to solve the energy crisis that faces our world. And only surface mining can be expanded rapidly enough to fill the demand.

Does this mean that thousands of acres of land will be laid waste? Absolutely not! Sound reclamation programs can and will return this mined land to productive use.

In over 3500 miles of travel throughout the Continent I have seen many forms of successful reclamation. In Kentucky I have seen hundreds of acres of beautiful hardwood timber growing where only scrub and thornbush grew in front of the giant strippers. In Indiana timber stands on mined land are valued at over $1000 per acre. At Du Quoin, Illinois, the harness racers work out on reclaimed spoils in the beautiful park that is the home of the Hambletonian Sweepstakes. A few miles away the Fidelity orchards produce thousands of cases of choice apples and peaches on the "new land" created by United Electric Coal Co.. At Fiatt I have watched fish by the dozens rising for crumbs thrown from the dock behind a beautiful home in the swanky residential area developed on spoil. Thousands of cattle graze on lush pastures in Ohio, Indiana and Illinois only a few years after the strippers have passed by. Near Peoria I have driven for twenty miles through fields of corn and soybeans where the shovels and draglines had plowed the earth for coal. In dry Wyoming I have seen fishermen reeling in their catch from clear ponds surrounded by rolling acres of grass and rye, with pheasants playing by the roadside. In Colorado at altitudes of over 7000 feet they are taking the top off the mountain and growing grass and blue spruce after the coal has been harvested. We have camped in campgrounds in parks created by mining, and shared their beauty with hundreds of other lovers of the outdoors. And I have been privileged to meet many of the dedicated men who are planning this reclamation, and have shared their experiences, and been shown their successes, and their failures, that have taught them what not to do.

We have much to learn from our friends south of the border where they have a forty year head start on us in the solution of their problems. But each area has its own peculiar problems that require their own special solutions. We are experimenting and trying any ideas that show any promise. By trial and error, and a combination of dedication and common sense, we too will find the answers to our problems - answers that will return our mined land to useful productivity.

In developing a sound reclamation program the first and most basic essential is the control of run-off and the resultant erosion. The amount of moisture that is retained in the soil is usually the factor that limits growth. No amount of grading or levelling will adversely affect a porous, sandy, or rocky material, but clay materials must be handled with extreme care to avoid packing them so moisture will not readily penetrate. Where difficult materials are encountered, selective spoiling must be devised to place the best materials on the surface. Species and varieties of plants must be carefully selected to achieve the best growth. But if erosion is not controlled until growth has been established, reclamation may become almost impossible.

In any mountainous terrain the problem of slips or slides is added to that of ordinary erosion. These can be avoided by careful planning before the overburden is first disturbed, but it must be remembered that the best of plans are made only to be altered as experience and common sense dictate. The larger the equipment used, the more difficult it is to adjust to unforeseen conditions. In a load and carry system using smaller equipment more flexibility is possible in spoil selection and placement, but costs are likely to be higher. Savings in mining costs must be balanced against costs of reclamation when a choice of equipment and mining plan is made.

In our stripping we do not generally encounter the highly toxic, acid forming materials that are present in the Appalachian regions of the U.S.A.. However, we do have less soil to support growth, and because of northern latitudes growth rates are slow. In mountain stripping, by making maximum use of what soil we do have, and with modern capsule and tubed planting procedures, I feel certain that good tree growth can be established, and that the assist given to nature in degrading the rock formation will eventually result in better growth than before stripping. Further,due to better moisture retention, an added bonus will be an increase in water flows in adjacent streams, to the benefit of all downstream ecology.

Reclamation requires time. Demanding instant reclamation is like demanding a meal without dirty dishes. It takes time to clean up the area after mining is completed, and nature, even with all possible co-operation takes time to heal her wounds. The drier the climate, the more northerly the latitude, the higher the altitude, the slower the progress. Then too, in our area we are still searching for answers to many problems of reclamation, answers that cannot be found except through a period of experimentation. And when we do find the answers, and have successfully reclaimed land it loses its identity as mined land and does not attract attention. Only the current operations stick out like a sore thumb and provide ammunition for our critics who demand instant results.

Whatever form of reclamation is done we must realize that we cannot please everyone. Farm oriented people want land they can farm. Those who value hunting are likely to prefer a rough terrain to to provide cover for game. Some feel that the creation of a few hills with ponds in between them adds variety in an otherwise level country, while the aesthetic senses of some "flat-landers" are offended by land that is not horizontal. Others resent any levelling of a mountain. Some want trees and others grass. Still others want to penalize surface mining without regard to what is accomplished, and demand that whatever is done be expensive.

There is no doubt that governments must insist on adequate reclamation. But any regulations must be flexible enough to allow for the wide variety of conditions that are encountered. Care must be taken to avoid rigidity that would put a straight-jacket on the individual initiative necessary to develop sound and economic programs. The effectiveness of any program cannot be measured by dollars spent, but rather by the results achieved. Money wasted on ineffective reclamation inevitably is a loss to all society. There are no simple solutions that can be decreed overnight, as some would desire, and a government that fails to recognize the complexity of the problem will harm rather than help conservation.

I am glad that people and governments are increasingly concerned about our environment. But in this, as in all else, priorities must be established. This better world we hope to build cannot be built on daydreams, or by wishful thinking. It can only be built and paid for by thriving industry. Cheap and abundant energy is essential to that industry. Without industry to pay the bills, not only will problems of the improvement of our environment, and of control of pollution, be impossible to solve, but so also will be the problems of unemployment and poverty. The surface mining industry will play an essential part in building this better world, while solving its own, relatively minor, problems of reclamation.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

In the prairies, is it your judgement that the level of technology is now available to make reclamation at a reasonable level a feasible operation within reasonable economics?

MR. R.F. McBRIDE

Yes. I believe it is, but I believe we will have to take a close look at such items as levelling. Levelling costs about $400.00 an acre. Return of surface material with less levelling may actually achieve much better growth and in my mind, better reclamation at a much lower cost to society.

DR. WALTER TROST

In some cases you don't want to necessarily restore the land as it was before. You might want to restore it in another way that might be useful. Taking the example of what had originally be good farm land, do you think it is feasible or desirable to restore that land after mining, to a good farm condition?

MR. R.F. McBRIDE

I don't believe that with the claim materials we have this will prove practical. There are others that disagree with me, and we have very extensive expensive areas on which we will try to establish growth where it can be farmed. But in the spoiled areas what we have there are about five acres that are now producing more grass than produced on the best farm land in that area.

DR. WALTER TROST

Could you go from grain to grain?

MR. R.F. McBRIDE

I would say grass with more rolling and rougher terrain is the answer. Cattle pasture - mainly, because I think that the grass is just as valuable a commodity as wheat in an agricultural community.

DR. WALTER TROST

In the foothills and mountains, do you think that the present level of technology and the economics do allow reasonable reclamation? In these areas, a different kind of reclamation is apt to be involved.

MR. R.F. Mc BRIDE

Yes, I have travelled through reclaimed areas in Pennsylvania and West Virginia that are just as rocky and rough as they are here in the mountains. They reclaim successfully in both the mountain and foothill areas. The Appalachian Region is very rough. They also have acid forming materials but, by careful planning they are able to restore better timber productions then were possible before they mined it.

There is another added benefit and that is water. In areas where successful reclamation practices have been followed, the streams have benefitted with a higher flow of water in low water seasons because of better moisture penetration in the rock formations. In other words, stripping has helped nature to grade rock that can support growth. Soil is scarce, and in our regions of higher altitude and slower growth, we will have more problems. I think we should look carefully at things such as tube and capsule seeding of forest products, and make the maximum use of small pockets of soil.

5.14 MR. D. BEECHINOR

FROM: JOHN SCHMIDT. AGRICULTURE ALBERTA. AUGUST 10, 1965.

Ordinarily David A. Beechinor of R.R. #2, Bentley, is a good, honest fighting Irishman. His fighting is confined though to normal agricultural activities against bugs, weeds, travelling salesmen, high costs and low prices and ornery hogs.

But for the last few years he has been more fighting-er than usual by reason that some oil companies came into his farm eight miles north of Sylvan Lake in the Blindman Valley. When they were through with him they had strung two pipelines at right angles to each other and drilled one well in his rich black soil.

> At this juncture I should point to the fact Beechinor has had his share of that famed luck of the Irish. He came into Blindman from Kindersley, Sask., in 1950 and bought a half-section from a well-known pioneer family. The farm was one of the 10 per cent in Alberta on which the owner held the mineral rights. He kept the minerals on the south quarter and sold Beechinor the minerals on the north quarter.

In 1955 one of the smaller oil companies came into the area and leased the mineral rights on the northeast quarter for a handsome sum. As could only happen to a person blessed with the Irish luck, a producing well came in on the northeast corner. Another company leased the mineral rights on the southwest quarter but didn't drill a well.

RESTORATION REQUIRED

The well produced until two years ago. In May 1964, the Surface Reclamation Council notified Beechinor the company had decided to abandon the well site but continue production by water drive through another well. Under a system of unitization, in effect in Alberta a larger company took over the operation from the smaller company and other in the area and pumped oil from one central well closing down many well sites. Oil is forced out by pumping water under pressure into the ground.

> Under government regulations when a company abandons a well site, it is required to pull the casing and the well-head fittings, clean up the site and leave it in the same condition as it found it before drilling commenced. This means that it should be left in such shape that the farmer from whom the company leased surface rights could commence to produce farm products on it once again.

The Calgary - based U.S. company therefore sent a crew in last summer to clean up the 2.6 acre site and road leading into it. This is when the real fighting started.

A CRUDE JOB

Beechinor contended that the site was not satisfactorily reclaimed for three reasons. Firstly, there was considerable crude paraffin wax left on the ground which would preclude pasturing cattle on the land. Also stones and subsoil left atop the ground make it difficult to work the land and it won't support domestic plant growth.

Secondly, during the oil companies' tenure, the weeds hadn't been cut since 1962; they are now a reservoir of infestation for the whole farm. Beechinor complained to the County of Lacombe weed inspector about them last year but he claims the inspector would take no action.

Thirdly, the crew constructed a jerry-built fence. The posts were loose and wouldn't hold livestock. Part of the hog wire was erected upside down.

He had a professional opinion to back up his contentions.

> Those conditions still exist today. Somebody had come in and cut weeds on part of the acreage (Beechinor doesn't know who it was) the day before I went out to his place recently. What was left was the damndest bunch of noxious weeds I ever saw. I burst out laughing at what they'd left for a fence. And I didn't have to look far to find the deadly crude paraffin wax lying about.

The company claims the local reclamation council has issued it a reclamation certificate. Beechinor says he has never seen a certificate. He refuses to sign a release for any amount of money until the site is put in the same shape as the oil companies found it.

'BIG STICK' METHODS

Beechinor cites what he considered another use of "big stick" methods on his farm. This was when one of the pipelines was being put through. He wasn't satisfied with the job being done by a crew of men assigned to clean up the right-of-way. He became fighting mad about this and ordered them off.

A company troubleshooter came around to get things moving again. They talked in Beechinor's kitchen for some time and were on the point of reaching an agreement when, on some pretext, the troubleshooter said he had to go to his car. He got into the car and kept right on going to a supreme court judge in Edmonton where he secured an injunction against Beechinor to prevent him from stopping crews working on the right-of-way and subsequently filed a statement of claim against him for $5,000.00.

The statement of claim acted as a big stick for the company. It was left hanging over Beechinor for a couple of years then withdrawn.

OBLIGATION FOR FAIR PLAY

"It all boils down to this," said David Beechinor. "I came here to farm and these oil companies followed along and interfered with my farm operation. I count upon the farm operation to make my living. They thus interfered with my method of making a living. What makes me fighting mad is that as a small individual I had a difficult job to get any redress or satisfaction from what I think are just claims."

> Beechinor's story could be repeated by hundreds of farmers. Some, like him, have joined the Citizens Mineral Rights and Justice League, the only organization which has been willing to take up the cudgels to protect individual farmers from being steamrollered by the legal department of the oil and pipeline companies.

Beechinor rightly points out that nobody, large or small, has the right to hold up progress. However, those who insist that progress is necessary should have an obligation to treat a person affected by the same with dignity and fair play.

5.15

BRIEF TO THE
ENVIRONMENT CONSERVATION AUTHORITY

Strip Mining in Alberta

by

N. Kvisle, Innisfail

The extent of coal deposits in Alberta was pretty well determined by 1920. Government reports released in 1921[1] reveal that there are three important coal horizons, all in the Cretaceous. The youngest coal in Alberta was laid down in freshwater swamps in a broad belt from Drumheller to Edmonton some 40 million years ago just before the dinosaurs became extinct. This so called Edmonton formation coal is a reasonably good quality lignite coal, and was mined extensively before natural gas and oil took over in the province. It is now used as fuel in the thermal electric plants in operation in various parts of the province. Deeper in the Cretaceous we have the Belly River formation coal which grades from lignite to bituninous. This coal was mined extensively at Lethbridge, and the deposits there had something to do with the choosing of the southern route for the C.P.R. in 1881[2]. People in central Alberta can still remember when they burned out the grates in the kitchen stove with the excellent Belly River coal from Saunders and Alexo which had so much volatile material in it that it could be lighted with a match. The Edmonton formation coal has up to 45% fixed carbon, 35% volatile matter, and and yields up to 10,000 B.T.U. of heat per pound. The Belly River formation coal is a little better, having up to 50% carbon, 40% volatile matter and yields up to 11,000 B.T.U. per pound. The reserve of Upper Cretaceous coal in Alberta (Edmonton and Belly River) is in the order of 500,000 million tons.

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1) "Mineral Resources of Alberta" 1920 and 1921 by John A. Allan, M.Sc., Ph. D. Professor of Geology, University of Alberta, Queen's Printer.

2) "The Last Spike" by Pierre Berton, McClelland and Stewart Limited.

By far the best coal in Alberta, however, was laid down in fresh water swamps in the Lower Cretaceous along the edge of the Cordilleran Trough some 70 to 80 million years ago. This coal is therefore found along the east side of the Rocky Mountains from the Crowsnest through Canmore, Ya-Ha-Tinda, Nordegg, Coal Branch, Grande Cache to the Smoky River and perhaps further north along the foothills. For 500 million years sediments totalling 70,000 feet had been deposited in the Codilleran Trough which was later to become the Rocky Mountains. Since the Kootenay coal was in the edge of the trough, it was covered by only a small amount of deposits. When the Rocky Mountains rose some 30 million years ago, these coal seams were compressed, folded, faulted, and sometimes (as at Nordegg), fractured. This Kootenay Formation coal ranges from bituminous to anthracite, and is nearly as good as any coal found in the world. It has up to 70% fixed carbon, 25% volatile material, and yields up to 14,000 B.T.U. of energy per pound. Known deposits of Kootenay Formation coal in Alberta amount to about 90,000 million metric tons.

The coal in Alberta, 13% of the world's total, represents fabulous wealth. This wealth can, at the moment, not be expressed in dollars, as the value of the element carbon may increase sharply during the next fifty years. Carbon occupies a unique position in chemical industry in that it is the only element that will link into chains. Linked carbon forms the basic structure of innumerable industrial products and organic molecules. When the supply of oil and gas runs out at the beginning of the 21st century, coal will be the only immediately available source of carbon. True, enormous amounts of carbon are tied up in carbonate rocks such as limestone and dolomite which are in unlimited supply in the Alberta Rockies; but the extraction of that kind of carbon requires inhibitory amounts of energy. Coal will continue to be used as fuel. Processes are now available to change coal into gasoline or even methane and ethane, the constituents of natural gas. To burn considerable amounts of fossil fuels may be necessary in the future to supply the requirements of plants for carbon dioxide. The CO_2 content of the atmosphere has increased from 0.0029% to 0.0031% during the past twenty years due to the burning of fossil fuels in piston and jet engines. Plants would, however, grow better if this were brought up to 0.01%. The climate would also become warmer and moister as CO_2 reduces radiation of energy from the Earth's surface into space. The glaciers of Greenland and Antarctica would melt, raising the ocean level by 150 feet. Some of the world's large cities should have to be moved up on higher ground. Land areas would be reduced, but areas suitable for food production would be increased, as increased rainfall would make deserts fertile. Twice during the Earth's history plants depleted the CO_2 content of the air and produced vast coal deposits. In both cases (Caboniferous and Cretaceous) glacial ages followed. Man may now have within his power to control the CO_2 content of the air and thus prevent the next ice age.

We must not overlook the great need of carbon for the reduction of ferric oxide into iron. The coal must first be made into coke. Much of the Kootenay coal in Alberta is suitable for coking; the volatile material is driven out by heat, leaving porous, pure carbon suitable for use in the blast furnaces. Except for the absence of high percent iron ore, Alberta would today be one of the leading steel producing regions of the world. We may praise ourselves lucky. Let Pittsburg, Hamilton, Birmingham, and Cologne make the steel and have the pollution that goes with it: let Alberta have pure air and pure water.

At this point we should perhaps note that the mining of minerals other than coal may strip the surface of Alberta. We have gypsum, salt, talc, peat, limestone, bituminous sand, building stone, and shale for cement manufacture.

The management of natural resources, renewable and non-renewable, is the responsibility of the Provincial Government, and therefore the responsibility of the people of Alberta. Decisions must be made. Policies must be formulated. Should we rip the surface of Alberta into shreds, extract the coal and sell it for what we can get? Should we keep our coal and use it for industries that we can develop within our province? Should we perhaps leave the coal where it is for the time being and see if better use can be made of it in the future?

Before we make any rash decisions we should consider some pros and cons. First of all, the quick disposal of non-renewable natural resources for the sake of temporary prosperity is not what we want. Secondly, I doubt if any of us really want to see Alberta as a supplier of raw material for industries in other parts of the world while our people go unemployed, and our secondary industries languish. Thirdly, the most important of all: what should we use our Alberta wilderness for, wealth or the good life?

Our renewable natural resources must always be more important to us than the non-renewable variety. At the moment our farmlands in the prairie and parkland regions are well looked after. The fertility of the soil is maintained and food production there is at a high level. To bad of course that the habitat was changed to such an extent that we lost the bison and the sharptail grouse. We still have the pronghorn, and as a result of farm operations we actually gained the Hungarian partridge, the pheasant, and the whitetail deer. We drained too many sloughs, but "Ducks Unlimited" restored some of the wetland. Pin tails and mallards are actually better fed than in pre-farm days. We have seeded in land specially for the ducks in some parts of the province, and should pursue that idea by buying up some of the poor land around Sullivan Lake and seed it annually to wheat, barley, and field peas for the geese.

The part of Alberta that we are concerned about in connection with strip mining and general management is the 100,000 square miles of taiga, the pine and spruce forests of northern and western Alberta. The characteristics of this area is such that it will be important for the good life of not only Albertans, but also all other Canadians as well as foreigners who have the good fortune to visit our province. Within this area we have an abundance of pure cool air, vast forests, clear streams and lakes populated by firm fleshed fish, meadows and hills providing grazing for elk and deer, shrubs and shallow lakes for foraging moose, snow free mountain slopes for big horn sheep, habitat for mountain goats, grizzly bear, cougar, ptarmigan, grouse and hare, and towering snow capped mountains with scenery unmatched anywhere in the world. We must now focus our attention on the part of this area that lies along the east side of the Rocky Mountains where the rich Kootenay formation coal measures are located, and where therefore the greatest damage to the environment is likely to occur.

Let us first take a look at one of the proposed sites for mining operations: Dog Rib Creek area west of Sundre. Anyone who has come there over the 8,000 ft. ridge from the Ya-Ha-Tinda or attempted to climb up from the south side can attest to the wild beauty of this place. Clear cirque lakes nestle under the forbidding slopes of 10,000 ft. Barrier Mountain. Sheep and goats as well as elk graze on the beautiful grassy ridges and slopes below, and the clear Panther River winds its way eastward from the Banff Park. Which is more important to mankind, a few easy come - easy go dollars or the enduring happiness of a visit to this gem of a place? One can imagine what mining operations would do to this scenery.

Let us conservationists, however, face the facts. The multiple use principle is going to be applied to this territory whether we like it or not. Forests are going to be put on a sustained yield 85 year cycle, and mineral deposits are going to be utilized. What we ask is that first priority be given to the recreational use

- tourism, camping, hiking, sightseeing, hunting, and fishing. In an increasingly crowded and polluted world people are going to demand this. Nor are recreational uses barren of economic returns. People are willing to pay where they get good value. Tourism alone should bring in 30 million dollars a year. With proper management the yield of meat from big game hunting should reach 500 lb. per square mile or 25 million dollars per year. The return of stocked rainbow trout per acre of lake surface exceeds returns from farm land. In addition to this we have the money spent by these people on licences, travel, and equipment. Before we make decisions regarding strip mining we must consider all the uses of this land, and priorities of use.

At this point I should like to introduce a theory that is well known to biologists, but which has not been made known to the public or been given much publicity in scientific journals because of its revolutionary nature. Conservationists fear that if the theory is put into practice by incompetent people, consequences to our wildlife and wildlife habitat could be disastrous. The theory itself is simple: Nature in the raw does not provide the best habitat for wildlife; the habitat can be improved by proper management. The following are important points inherent in this theory:

1. In an unmanaged ecological community animals live up against a food limit, An increase in the food supply results in an immediate increase in the population. Animals die from lack of food.

2. The plants that a given species of animal can benefit most from will be consumed and destroyed by that species. The animal is then forced to subsist on inferior food plants. Such animals will be weak and fall easy prey to parasites, disease, and unfavorable climatic conditions. Their flesh will not provide the hunter with good meat.

3. The evolutionary response to marginal existence is reduction in the rate of reproduction. Decreased birth rate increases the food per individual and enhances the chance for survival. Biologists have now come to ascribe to this factor the functions of reduced reproduction under conditions of "crowding", the "crash" of the ten year cycle in rabbits and grouse, the "spreading" from population concentrations, and the killing of their own young by many species. Grizzly bears and whooping crane have reduced their rate of reproduction to the point where they face extinction. Only by so managing our wildlife habitat that the food supply will always be abundant can we reverse this process and cause moose, elk, deer, and grouse to produce even more offspring than they do at present. A principle now accepted and applied in our province is that an adequate hunter harvest, say 25% of the population, must be taken annually to tailor population density to food yield.

4. The total yield of fish and game harvested by sportsmen can, however, be increased only if the rate of food production is increased. All life on Earth is supported by the food produced when the magic pigment chlorophyll traps the energy of sunlight, uses this energy to split water into O_2 (given off as waste), and H_2 which is combined with CO_2 to make the various linked carbon compounds (proteins, fats, carbohydrates etc.) that animals can use for food. Only a fraction of one percent of the sunlight that reaches planet Earth is now used to support life. In a given area, by proper management, this can be increased manifold. The secret is to grow more plants of the right kinds.

A mature forest can support only a limited population of moose, elk, deer, and grouse. This is particularly so when the forest consists of a dense stand of lodgepole pine such as we find it in 80% of Alberta's forests today. In the past forest fires have removed the old trees and rejuvenated our big game habitat. After a fire, grasses, herbs, shrubs, and young saplings provide food for the animals as a new plant succession gets underway. Today, when old trees are removed during operations involving forestry, mining, seismograph work, oil drilling etc., an excellent chance for the rejuvenation of plant life presents itself. Often the surface is scarified or otherwise disturbed. Whether the land is denuded by fire or commercial operations, the stage is set for increased food production. Inexpensive seeding or other propagation of valuable food species such as Dutch clover, alsike clover, sweet clover, blue grasses, fescues, timothy, two species of dogwood, a dozen species of willows, wild rose, elderberry, raspberry, gooseberry, saskatoon, cherries, bearberry, ground cranberry, blueberry, and others recommended by the biologists as being suitable for a given habitat would help. Consideration should be given to hardy and valuable species from other parts of the world with similar habitat, such as Siberia. Nor would the propagation of these food species prove a hindrance to the propagation of forest species such as spruce and pine. The latter are slow at starting and would be sheltered by the shrubs. One should note that as forestry gets underway in Alberta there will be a shift away from lodgepole pine (a fire species) to spruce and aspen which are in fact better for pulp wood but do not do as well on poor soil.

The food supply for fish can be increased by the creation of small lakes in our wilderness areas. When the glaciers left our province some 10,000 years ago, our foothills were dotted with small lakes. Since that time, outlet creeks degraded, emptying the lakes. Beavers have lent a hand in restoring some of the impoundments, but we must now call on the bulldozer to help out, and use a bit of cement for overflows. We should get waterlilies, sedges, the right kinds of algae, and crustaceans such as the gammarus fresh water shrimp started. There would be moose, beavers, birds and insect life there, and a very rich environment for rainbow and other species of trout. Such lakes would transform our wilderness into the greatest in the world.

Other ways of improving our wilderness should be considered. Much of our taiga would appear to be suitable habitat for the world's greatest game bird, the grouse which in England is called the capercailzie, as well as its smaller relative, the black cock. The capercailzie reaches a weight of 14 lbs. and is found throughout the pine and spruce forests of Eurasia. Small amounts of fertilizer scattered by plane on our mountain grass flats would certainly increase the food supply for elk and deer. Strips of forest and other vegetation must at all times be maintained on both sides of our streams, and the stream banks protected from the hoofs of cattle. Grazing of cattle in our forests should be discontinued. Big game animals should utilize the food plants. Waters must be kept free of pollution. As time goes on the biologists will discover new ways of improving the habitat of our great wilderness.

Improved management of our wildlife habitat is entirely possible, and is of such importance that it must be given priority over all other usages. We can look with optimism to the future. Our grandchildren will have much better fishing and hunting than we have today. The efficient, intelligent, and dedicated wildlife biologists employed by the province must be put in charge of operations. Some of the profits from mining, forestry, and oil must be siphoned off to meet expenses. Boards of directors of corporations will cooperate, for they are also human beings interested in wildlife. They will also have the best possible cooperation from the public if they contribute to conservation.

Let us make the Alberta wilderness the greatest in the world. We have a free and progressive outlook, unhampered by tradition. The cooperation of individuals, wildlife organizations, corporations and a variety of scientists will be needed; but in the final analysis it is the Alberta Government with its Environment Conservation Authority and trained biologists that will make the decisions.

5.16

Brief by J. Towle
Past President
Lacombe Fish and Game Association
LACOMBE, Alberta

To the Environment Conservation Authority:

As an organization dedicated to the betterment and control of our great outdoors with fishing and hunting, wildlife protection and the concern for the shrinking habitat, we have to take a good look at "Strip Mining Policy".

It has always been a particular point of concern of mine, having taken numerous trips into our remote areas, namely two or three areas. The terrible scars left by the strip mining of coal in the areas of the coal branch, the old Mountain Park and the Wabamun. This country is wild and beautiful until one looks closely at the disturbed areas. Great slag piles lying around, ground fires in discarded coal dust and nobody really seems to care. Creek beds heavy with silt are not very attractive. While travelling in the Grande Cache area along an almost inaccessible valley, namely Sheep Creek and see the testing spots where exploration has taken place. They may be small areas but there are great piles of overburden pushed over the sides of beautiful mountains to lie and erode and wash, unchecked to the stream below. These desolate piles of slag are an eyesore to the area and kill all vegetation under them and the erosion continues long after the top has disappeared.

Another point of contention is the places they seem to choose to exploit. Mount Rundle has long been a scenic point for tourists. It is situated in the Rockies. Pictures are published all over the world to advertise the tourist values; I wonder if they will be so quick to publish pictures of an open pit mine with the same results expected.

Strip mining is probably the most economical way to produce the product so vital to the economy but the anti-pollution and reclamation price should, and must be born by the production of that product. I think we sell ourselves short by giving away this non renewable resource by the low royalties that are paid. Cash bonds of sufficient size should be posted for the insurance of reclamation of satisfactory nature and offensive to none.

The lessons learned in the other great coal fields should be carefully studied, strengthened where necessary and closely adhered to by an inspection authority that has to answer to any and all deviations from the said policies.

With this brief I don't want to suggest that we hide our strip mines, far from it. They should be chosen carefully, controlled by good and strong laws of progress and cleanliness and in a condition to be advertised as a good economical venture for the very people and country that make it possible to extract this vital fuel for the good of the greatest number of people, along with the first thought to the protection of the environment.

5.17

A brief prepared for the December 17, 1971 public hearing regarding:

The Environmental Impact of Surface Mining in Alberta

Brief prepared by:

Mr. Robert Guest
founder, Canadian Wolf Defenders
10989 126 Street, Edmonton

and

Mr. David Roles
president, Defenders And Wardens of Nature
#312 10711 Saskatchewan Drive, Edmonton

In an age when the global impact of pollution and environmental destruction could influence the well being of future generations; government, industry and private citizens must each tread carefully and make sacrifices to insure the survival of our species.

Many industries are beginning to take positive action on their own accord, to safeguard the health of our life support system. In fairness to these resposible industries; strict, enforced legislation will be necessary to insure that other industries will do their fair share to preserve the environment. This would also guarantee all industries equal and fair competition.

In view of the serious impact which surface mining could have on one of Canada's most beautiful provinces, the following points should be considered in drafting legislation, to insure that our province will remain healthy and beautiful.

A. Reasons for Concern

1. Strip mining often adversely affects wildlife habitat and consequently can adversely and seriously affect wildlife. Alberta is home to several endangered species including the wolf, cougar, grizzly and certain birds of prey. Every possible precaution must be taken to insure a minimum of damage to their environment.
2. Strip mining is notorious for defacing aesthetically appealing countryside to the point where it is transformed into a desolate, sterile moonscape. (see figure 4)*
3. The strip mining industry with some exceptions, has a very poor record of land restoration and reclaimation. (The two accompanying photographs taken in Alberta (Figures 1 & 2) bear evidence to this fact.) Strict land reclaimation standards must be established and enforced by the government.
4. Careless mining practices which pollute lakes and streams are not uncommon (see figure 3). Care must be taken to avoid this at all costs.
5. Strip mining tends to destroy natural watershed,which includes forest and ground cover over vast areas. Such an area is frequently the headwaters of many rivers and streams.

B. Information which should be made available to the public

1. The government should clearly define the term "reclaimation".
2. The public should,on request, have access to maps and photographs of areas proposed for strip mining.
3. Information should be open to the public regarding possible effects on specific areas proposed for strip mining. This information should include the possible effects that strip mining could have on geological and scenic features present in the area concerned, species of flora and fauna which could be affected, possible impact on water resources in the area, and possible effects on features adjacent to the area.
4. The size of the area to be strip mined and the duration of the lease for the area concerned should be made known to the public.
5. A government statement should be issued, describing to Albertans, the benefits to be derived from any area which is to be strip mined. This statement should include an analysis of the benefits provided versus possible environmental damage.

C. Environmental Quality Legislation regarding surface mining

1. A board should be formed for the implimentation and enforcement of environmental quality legislation. The Environment Conservation Authority should play a role in the establishment of the board and should be granted a permanent seat thereon.
2. The board should be responsible to the minister of the environment and should be required to report to the legislative assembly when in session.
3. Should the board fail to enforce the implimented legislation, any citizen of the province of Alberta should be able to commence an action in an appropriate court, requiring the board to perform its duty.

D. Conditions under which leases for strip mining should be granted

1. Where strip mining is proposed near scenic areas, National Parks or ecologically unique areas; a public hearing should precede each granting of a lease. Importance of the environment should be weighed against the importance of the potential resources.
2. If a lease is granted, then the total estimated cost of reclaimation should be paid for in advance as a deposit before operations are allowed to commence. The estimate should be somewhat pessimistic to take into consideration any inflationary costs.
3. Leases for strip mining should not be granted to any company which has a poor record of reclaimation unless that company makes amends by restoring areas it has previously damaged, to the satisfaction of both the government and the public.
4. The size of the area to be strip mined, the duration of the operation, and the time limit for restoration should be decided upon and fixed in the initial lease.
5. Public hearings should precede any future request of a company to exceed the predetermined limits of point 4. If further operations are allowed, additional reclaimation deposits should then precede further operations.
6. All employees of mining companies must leave wildlife in the environs of strip mined areas unmolested. Harrassing, or illegal shooting of wildlife by mining company employees, cannot be tolerated.

E. Enforcement of conditions outlined in section "C"

1. Violation of lease conditions should result in termination of the lease and close of operations.
2. Illegal shooting of wildlife outlined in point 6 of section "D" should be met with a fine of at least \$1000.00 to the employee and \$1000.00 to the company.

F. Short term profits versus long range implications

1. Should coal or other non-renewable resources be exported outside the province, if future Albertans will require them to power future Alberta industry? Obviously, an export limit must be placed on all non-renewable resources.
2. Has any study been made to determine the estimated resources required to supply the needs of Albertans ten, twenty or thirty years from now; or will we find it necessary to import the very same raw materials which we had previously exported?
3. Has any study been made concerning the possible long range implications which surface mining could have on the ecology of particular regions of Alberta which are under consideration for strip mining?

With carefully planned legislation, and the cooperation of mining companies with regard to reclaimation, strip mining may proceed in certain specific areas of Alberta without serious damage to the environment. Let us learn from the mistakes of the past so that we may with pride, hand an intact province over to our children, with the knowledge that we cared about the kind of world they live in.

Robert C. Guest

Robert Guest
Canadian Wolf Defenders

David Roles

David Roles
Defenders And Wardens of Nature (DAWN)

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* Photographs are not published with these proceedings but are available in the Information Centre of the Authority.

DISCUSSION: MR. KERR

I feel that I should tell you this because today I spent three hours with an aged gentleman who is 86 years old. He is also blind. He has been blind for a number of years, however, prior to his blindness he was one of those people who enjoyed the outdoors and particularly, the foothills and mountains of west central Alberta. He had heard about these hearings and knows what everyone is saying, including the people who have presented this hearing and he asked me about it. He asked me a question that I have thought about a good deal since. That is "What is our hurry to develop our resources?" I know that the coal people have presented us with a case and many of us have presented a case to the Environment Conservation Authority for the preservation of certain areas. We have all agreed on one point - that we should have good reclamation so our environment doesn't deterioriate. On the other hand we haven't said that certain areas of the mountains must be set aside. If it is torn up today we can't change it, and I think that is the point many of us were making today and in other hearings.

MR. R.F. McBRIDE

I believe the most conservation minded group of people that I have encountered in the North American Continent are the coal operators of this continent. At their convention in Pittsburgh last spring one-third of it was devoted to reclamation. Anyone who wasn't in favour of reclamation was chastised about as severely as anyone opposed to motherhood.

MR. E.J. PANCHYSYN

I would like to direct my question to Mr. Kvisle. You mention making some artificial ponds in the foothills for trout. The procedure now for open pit mining in the foothills is to back-fill the pits. Previously they were not allowed to be backfilled because of the mine's regulations in conjunction with underground operations. The procedure is to backfill these pits, therefore, are you suggesting these pits should be left open to accumulate water so that we could stock them with trout?

MR. KVISLE

I think that this is quite possible in many cases.

MR. E.J. PANCHYSYN

It is a consideration whether we should backfill a pit or not. It would involve extremely good catchment pond and conserve a water wupply. It could be stocked with fish and utilized by fishermen.

On open pit mining in the foothills and pitching seams, all your pits could be open.

If you mined them in series or alone you would have to mine one out to your economical depth, or to the bottom of the sink line. If you mined another one you would carry the material, transport it, and backfill this hole. This wasn't done in the Crowsnest Pass in the 50/s and these pits were left open. The ones with low drainage are filled with water and were stocked with fish successfully.

THE IMPACT ON THE ENVIRONMENT OF SURFACE MINING IN ALBERTA

SUPPLEMENTARY SUBMISSIONS TO THE AUTHORITY

ENVIRONMENT CONSERVATION
AUTHORITY

P.O. BOX 1006

PHONE 674-2929

Ewart W. Stutchbury - Q.C.

BARRISTER — SOLICITOR — NOTARY

6.1

BARRHEAD,
Alberta

Nov 25th 1971

The Secretary
Environment Conservation Authority,
Edmonton, Alberta

Dear Sirs:

Strip Mining in Alberta
Public Hearings

The question of coal in Alberta has always interested me, even if it is purely academic. My father was Coal Commissioner in the hey day of Drumheller, and launched the first car shipment to Ontario, which according to the Hansard of the day, was the last. Why politics had anything to do with it was always the sixty-four dollar question. A book by Nordegg (in the public library) is interesting for those who run and read. I believe Jimmie Richards was a mine inspector (father of Mrs. Cecil (May) Bennett.) My brother worked through Brule and the Blue Diamond Mine till its pitching seam pinched out.

As a Boyle street resident we knew that the city was undermined, but try and prove it. Whether by shaft, drift or strip, coal is where your find it. Wabamum was never a good seam, too much waste top and bottom.

Forestburg needs about 35000 tons a week. Am I over estimating? A six foot seam consistent over an area of one acre should produce a potential 10,000 tons. Its obviously a disappearing commodity.

The legal aspect can be intriguing. When the Sand and Gravel Act was passed in 1951 to protect farm owners who had gravel on their lands, it was founded on a preamble which I need not here recite, but the reported case in 1952 was a classic for the profound judgment of the then Chief Justice George O'Connor, who in so many words implied that where recovery comes from farming lands so as to make them unfit for cultivation, then the farmer owner should, in effect own whats under the lands. Seems to me I recall what Shakespeare wrote at another time, and which Portia so ably defended.

Is there anything which differentiates cultivated or arable lands with relation to sand an gravel, from the same proposition in recovery of strip coal, or Oil Sands covered with arable soil. Your guess is as good as mine, but remember I mentioned it first.

It is easy to penalize the big boys like Calgary Power or the Grande Cache group. It is questionable if soil can be properly

P.O. BOX 1006

PHONE 674-2929

Ewart W. Stutchbury - Q.C.

BARRISTER — SOLICITOR — NOTARY

BARRHEAD,
Alberta

Nov 25th 1971

replaced. A contractor building houses can replace token black soil but it is not the same as the virgin soil he found. On the other hand breaking the "seal" of the sub soil is all some arable lands need for holding moisture. It is a cliche that nature has more effective weapons to erode good soil and change water courses, and pollute them than man has ever devised. A University Professor at Reno University last spring said that advanced photography when used in the Hawaiian Islands was almost uncanny in its detection of underground water streams of pure fresh water which if not trapped found their way in unending flow to the sea. And who is to stop it. MAN and his machines.

I sometimes wonder what steps have been taken to correct the eyesore which greets travellers in the Estevan District where strip mining was apparently abandoned in the 30's and no attempt to fill in the gaps. At that time a ten yard Bycyrus electric shovel made a road way about 30 feet down across the prairie, and a small shovel had to attempt to back fill. Since they are short of water in that district, and also of good arable land this might be the place to start, where no company is at hand to do the backfilling. No doubt the present thinking is sound, namely while responsible companies are at work, to see that they finish the job. My information is that Calgary Power are at least attempting to level off what they have undermined.

Farming, clearing brush and trees, draining muskegs and the ordinary building of roads will always aggravate erosion, and it is problematic if the area strip mined, aside from its appearance from the highways, is any larger that lands used for other purposes, or any more erosive.

These may be rambling thoughts. They may relieve the academic figures you must encounter in many "dry" sessions. My heartiest approval to all people of good will, who without discrimination or thought of possible reward in a monetary sense, strike at the root of the problem and come up with a practical solution.

Yours very truly,

E. W. STUTCHBURY

6.2 D. A. HACKBARTH

I would like to present some views relating to the environmental impact of surface mining in Alberta. I do not necessarily wish to present these views at the upcoming public hearings but would like to set them down for the record.

It seems to me that there are two important points missing from both your "Prospectus" and the pending draft legislation presented to the Conservation and Utilization Committee:

1. There is no provision made for any type of "environmental impact statement" relating to strip mining. The U. S. now requires that such a statement be presented along with the application for any type of development. In a recent letter to Dr. Trost I referred him to U. S. Geological Survey Circular 645 - "A Procedure for Evaluating Environmental Impact". Something of this nature should be required for all strip mining operations in Alberta if not for all projects with an environmental impact.

2. There is generally quite a lack of quantitative information on the environmental effects of strip mining. Alberta is no exception to this observation. Even though strip mining is a major industry here, there has been very little monitoring of its impact on the environment. I feel that a comprehensive monitoring program should be required by law prior to issuance of an exploration permit. After all, it is a little unrealistic to require reclamation without establishing the state to which an area must be returned. This monitoring should be comprehensive, installed and maintained by the developer, with data presented to the Department of the Environment for the total duration of the project plus a suitable length of time. It seems to me that this is the only way in which a significant volume of data can be accumulated in order to validly assess the environmental effects of strip mining. In addition, it is not realistic ally possible to produce a valid "environmental impact statement" without quantitatively defining the parameters of the environment prior to "development".

A comprehensive study of the influences of coal strip mining has been presented by the U. S. Geological Survey as Professional Paper 427A-B-C, entitled "Description of Physical Environment and of strip mining operations in parts of Beaver Creek Basin, Kentucky, 1955-1959; Influences of strip mining on the Hydrologic Environment of parts of Beaver Creek Basin, Kentucky, 1955-1956", respectively. I have included copies of the abstracts from these papers *. I might suggest that a perusal of them, particularly the latter (C), could provide a useful background for questions at the hearings.

* These are available in the Information Centre of the Environment Conservation Authority.

COPY OF A LETTER FROM: C. R. CHANDLESS, BOX 621, ROCKY MOUNTAIN HOUSE, ALBERTA

6.3 RE: IMPACT OF STRIP MINING IN ALBERTA

December 13, 1971

Dear Sirs,

I am unable to take time off from work to attend this hearing but would still like to put my views before you.

These views are not based on the moment but from having followed the course of strip mining over the last 20 years.

1. It is known to be nearly impossible to reclaim and reforest areas of the type making up the foothills after stripping.
2. To return to its natural state would take an exceedingly long time, perhaps running into centuries.
3. It will disrupt the watershed leaving a water shortage.
4. In the long run water is a more valuable resource than coal.
5. What water run-off there is will poison all streams and rivers it runs or seeps into.
6. Surely the people will benefit more from the countryside as it is now. The parks will not supply what the people need in the future as they are not big enough now and not all people want to be in a crowd. We will lose income from the tourist trade.
7. The mines will be running through some of our best areas for elk, moose, sheep,deer and bear.
8. It seems the mines would provide very few jobs, how many would be for actual Albertans, i.e. what percentage? What would be the net profit to the Province? Would it outweigh the foregoing losses?
9. When the coal companies talk about reclamation, it is always about places with a good depth of top and sub-soil, not the sparse soil of the foothills. Can they show us successful reclamation of 10 to 15 years standing in our area as proof of their claims as it is about that time they fail.
10. After all, even snowmobiles and wheeled vehicles used often in this terrain we are told will endanger the environment! Whilst here is proposed to rip the very heart out of the land!!

I am grateful for the opportunity to put my views before you.

Yours truly,

C. Chandless

COPY OF A SECOND LETTER FROM: MR. C. R. CHANDLESS

RE: IMPACT OF STRIP MINING IN ALBERTA

Even though I have already written on this subject I should like to emphasize one point.

The damage strip mining would do to the watershed in the foothills would be enormous.

Not only would we lose the water that is stored in that area which could never be replaced, but seepage of acids, etc. would poison our rivers and streams. This can be seen in the U. S. A. where even with the water being neutralized communities downstream have to spend millions extra to make the water fit to use.

All the work that is going into the possibility of reclaiming land after mining say that to reclaim the land well is uneconomic.

6.4 FISH AND GAME ASSOCIATION, MEDICINE HAT, ALBERTA

Presented by: E. E. Scoville

In a quote by Stewart L. Udall of Louisville, Secretary of the Interior, he said - "Strip mining is an essential industry and it should not - cannot - be banned, outright across the nation . Under Kentucky law, the strip mining industry is regrading and planting thousands of acres in long term reclamation projects, that are conducted almost simultaneously with the extraction of coal.

The industry in 1967 reclaimed 2,000 acres more than was disturbed by mining. 25,000,000 trees were planted; thousands of game birds and hundreds of thousands of fish were released in reclaimed mining areas. This is a measure of good citizenship, good laws, and good law enforcement of a good law".

The same thing can be done here in Alberta if we press for good laws and good law enforcement of an adequate law. If the members of our new present government are conversant with the facts and are willing to do something about correcting obsolete reclamation, and formulating new legislation with sufficient detail and enough teeth to stop the ravage of our wilderness areas.

I do not mean to say we should stop all exploration and exploitation but we should have a little more foresight and be a little more "conservation-minded".

Conservation means using resources of the forest in such a way that they can continue to be produced far into the future. Conservation refers to when and how are used - not only how much. No conservation leads to conditions which make it impossible for the forest resources to naturally renew themselves.

Forest litter humus and roots give forest soils an exceptional ability to absorb moisture and resist erosion. Man and animals may be harmful or beneficial to the forest.

Some lands are better adapted for the growing of forests than others. They can be managed to produce a continuous supply of wood, wood production, wildlife, water and recreational opportunities but public use of forest land carries an obligation of good citizenship. Quite often private industry will not respond in this way therefore we have to have laws and people to enforce the laws.

We must make our current Ministers aware that they, like us, are there to carry out the wishes of Albertans for the good of all Albertans, and it is our duty to see that they do.

The constant increasing demand for land, for the many segments of Canadian economy is seriously closing in on the habitat of plant and animal life. Albertans must take a real stand and protect the constant encroachment on our wilderness areas. Today more than ever before, we should be saving some of what we have been destroying in the past.

Hon. H. H. Somerville, Deputy Minister of Mines and Minerals, when discussing leases in wilderness area made the following remark. One more look may insure that no minerals worth extracting in the region exist. After that the province could choose the next most economic alternative and turn the land into wilderness area for recreation purposes.

(Edmonton Journal - August 19, 1970)

Wilderness areas are no longer wilderness areas after exploration and exploitation has taken place.

The question has been asked "must we develop all our resources in our life time?". Statistics show that our resource appetite is growing at such an alarming rate that our non-renewable resources may be exhausted in our life time.

We will soon be able to discuss all the bag limits, special seasons you want and whatever methods of getting your fish or game is best, and when you are finished you may suddenly and finally realize that it was of no use because you failed to consider conservation and there is no longer any habitat or environment or game or fish to apply your bag limits to. Men are encroaching upon the places where they live, changing them beyond the power of wildlife to cope.

Example: In the Livingstone Range, close to the Old Man River, there is presently a company taking core samples and doing test work for strip mines. They have stripped miles and miles of roads back and forth up mountains there. You could drive all day on roads that the Longear Company has built.

Two years ago another hunter and myself were back in that same area on horseback and were extremely impressed with the mountainous streams,wildlife, and the remote beauty and solitude of the area.

There are other outfits scattered all the way from Coleman up into the Kananaskis. I presume this is going on all over Alberta.

In our rush to explore and extract, man has forgotten how many years it has taken natures magic to produce our resources. If proper reclamation procedures are practised and man is willing to move a little slower and put back something. We have been most unreasoning in allowing the destruction of our environment in the name of a better way of life and prosperity.

We are now seeing the coal industries clean up. We are told that many of the former operators are gone and the public will now have to pay the shot for the cleanup.

Experience, research, and a careful borrowing from the statutes in other states went into the drafting of Kentucky's present strip mining law, now generally adopted as the most complete and most successful such law in the country.

While it is unmistakable that Kentucky has a rigid enforcement policy. Violations are at a minimum, operators are adhering to the intent as well as the letter of the law. Land is being restored to a desirable contour, water pollution is being minimized, successful planting of affected areas is being accomplished and the strip mining industry is enjoying a far better public image.

Kentucky was one of the first areas in America to be opened up and have had many more years of experience than we have.

I propose that our Government of Alberta get hold of the statutes in Kentucky on strip mining, and that we use the experience research, and careful borrowing that they did. Let us profit by their experience and use many of their strip mining laws for ourselves.

cc: Alberta Wilderness Association, Calgary.
Environment Conservation Authority, Edmonton.
Alberta Fish and Game Association, Edmonton.
Medicine Hat Fish and Game Association.

CANFORD ENGINEERING LIMITED
Consultant Mining Engineers
Hydraulic Power Specialist Engineers

5.5

December 18, 1971

EPORT # 92/ECA 1 -- WRITTEN CONTRIBUTION TO PERIOD III (DISCUSSION) OF THE PUBLIC HEARING BY THE ENVIRONMENT CONSERVATION AUTHORITY IN EDMONTON ON FRIDAY, DECEMBER 17, 1971.

. Areas of Competence:

The ultimate paragraph on p5 of the Prospectus appears to pigeon-hole environment specialists as distinct from coal mining specialists. We respectfully submit that our areas of competence lie within both fields, vis.,

1.1 Our Company specialises in studying and developing underground mining techniques for the safe and economic extraction of solid fuels and minerals. The writer is a Professional Engineer in three of the four Western Provinces, and is a holder of First Class Certificates of Competency in Coal Mining Management.

1.2 Family vacations since coming to Alberta in 1969 have all been spent in walking or riding expeditions in the Rockies. (We commence in this vein since we feel sure that such dual interest is held by many mining engineers.)

1.3 Canford Engineering operates a map service showing both Alberta and B.C. coal leases in the Mountain - Foothill areas from the 49th to the 58th parallel used by some 25 companies. We obtain feed-back of exploration efforts and with this

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knowledge in mind we wish to make observations on some specific points raised in the submissions.

2. Mountain-Foothill Coal Economics:

Brief 5 stated that despite the billions of tons of proven foothill coal reserves, deposits recoverable are scarce. We concur with and emphasize this observation. On this theme we comment:

2.1 The briefs on environment in the foothills accepted in the main that mining of coal will continue; the authors realise that Alberta's wealth - and hence the wherewithall to allow residents leisure time, vehicles, gear to enjoy the mountains etc. - comes in the main from its resource industries.

2.2 Although APEGG did not submit a brief, it published in the current issue of the Journal a paper by Prof. Dramchuck, P. En showing that the decline of oil and gas in the province will commence in 2 or 3 years, and will fall off as dramatically as it rose.

2.3 The heavy operational losses of two of the three new foothills coal mines, and the "break-even" state of the other three, have discouraged potential operators, and there is at this moment a decreasing amount of money being made available for exploration; major companies are currently doing an urgent re-think.

2.4 All the briefs from the operators welcomed the rapidity of action by the Authority to establish new laws. All opposed the expropriation clauses of the suggested legislation. We feel that such a threat would be a serious deterrant to producer and potential customer, and we feel certain that the new laws, should exclude such clauses, and include instead clear guidelines to a firm law enforcement agency. (We would point out that, despite the large increase in output of coal in Alberta, the Mines Inspectorate have taken on only one new Inspector since the coal depression days.)

2.5 The briefs from environment societies asked protection for many facets. Two excellent suggestions were zoning of mining permissability and preparation of overlays. We suggest that the basic map (or underlay) should show areas where coal mining might prove economic in extraction and transport, and such transport routes.

2.6 These coal areas should include foothill reserves of high quality non coking bituminous coals which are suitable for blending, transport to Eastern Canada as a thermal fuel, or gasification at sites close to the existing natural gas pipeline system.

2.7 Also called for was a body of experts to study proposed mining and reclamation plans -- no mention was made of including a mining engineer on such a body. We consider this essential (listening to authors talk about "strip mining" the mountains-foothills coals shows a total lack of understanding of surface mining systems.)

3. Mountains - Foothills Region.

We appreciate that the Authority is limited to the Province of Alberta in its public hearings. We submit that this is unfortunate and that new laws should apply to the entire region. Our reasons are:

3.1 Mining in British Columbia NW of the artifical 120 degree W provincial boundary may have serious effects on the Alberta environment. The Federal Minister of the Environment has criticised the B.C. Government on the Peace River Dam project and its effect on Alberta.

3.2 Future mines may cross the boundary as does one of the Coleman Collieries surface mines. Examples are the Denison Mines leases in Smoky and Quintette (B.C.) and the Rio Algom leases in the Kananaskis and Elk River (B.C.)

3.3 Provinces must not be "played off one against the other" as one author wrote. // We appreciate that a significant historical event in Canada was granting to each Province the right to control its mineral leases, and hence an all encompassing Environmental Authority for the Mountains-Foothills is not likely to become a reality. We submit however, that the proposed legislation be discussed between the two Provincial Governments before presentation to the Assembly. We consider it worthy of note that the routing of visits from all departments of government to the B.C. Elk Valley coal production and exploration companies is through the B.C. Mines Inspector's office in Fernie, B.C. By noting this we are not advocating that the Inspector is the only route, but that a single co-ordinator for government will ensure that government bodies and mine operators make maximum use of their time and talents.

New Mining Techniques.- Conveying.

As underground mining engineers we have been involved (the writer personally for over 25 years) in conveying by flexible belting or chain. We have studied systems in Europe and South Africa in coal mines, and the use of conveying in Canadian mines has increased dramatically in the past seven years. In the past two years, new technology has evolved stronger flexible belting, currently being introduced in the Tar Sand surface mines. We comment:

4.1 Our Company has just completed a proposal report for a client to use conveying in strip mining on the plains. The object of this is to reclaim ground after coal removal in months rather than years. Our client proposes that this be the subject of a special meeting of the Mining Branch of C.I.M., possibly in Calgary, and the paper and discussion be thereafter published in the C.I.M. Journal. The proposals are seen not as a panacea but as a catalyst.

4.2 Two authors points out that an open-pit in the mountains-foothills, after abandonment, could provide a wide protected level area in undulating terrain for a resort or campground, and possibly reveal unique geological structures for posterity. We consider that the overburden from such an open-pit could likewise be conveyed a considerable distance and deposited in an area to give maximum benefit. This cannot be economically considered due to the limited distances which trucks, used by all the mining companies, can move the overburden. The economics of conveying are not limited in this way.

4.3 Concern has been expressed on the environmental disturbance of rail or truck roads. Author #6 showed slides of a road and advocated "slope stability". The mountain shown was obviously steeper than the angle of repose of broken rock and hence the only way to prevent slides of rock was to remove this material from the area by truck. Overland conveyors for coal clearance requires the minimum of surface disturbance.

5. New Mining Techniques - Getting.

We have followed closely the advance of new techniques in the foohills, particularly hydraulic mining; a colleague recently studied advances in Russia. A recent article in C,M.J. advocated ploughing. Other mining engineers are examining "hardrock" techniqu for our steeply pitching seams. Dust extractors at adits can prevent blackening. The economics of the seven underground foothill coal mines, we believe, are encouraging.

6. Conclusions.

While your proposed legislation pertains to "surface reclamation", nevertheless, we feel that our foregoing comments lie within specific 10 (page 6) of the prospectus "new and improved mining techniques", while our observations on the Alberta Economy and on Regional Co-operation in the Mountains is very pertinent to the subjects being heard in public by the Authority.

Respectfully submitted by

THE ASSOCIATION OF
PROFESSIONAL ENGINEERS
OF ALBERTA
PERMIT NUMBER
P462
CANFORD ENGINEERING
LIMITED

Neil J. Duncan, P. Eng., F.I.Min.E.

cva

NEIL J. DUNCAN

N. J. DUNCAN

Expiry Date: Nov. 23, 1972

Coal Mines
Certificate of Competency
Dept. of Mines, British Columbia
First Class No. A226
Neil J. Duncan, P. Eng.

December 21, 1971.

6.6 BRIEF TO THE ENVIRONMENT CONSERVATION AUTHORITY WITH REGARD TO SURFACE DISTURBANCE FROM MINING: DETECTION OF DAMAGE, MEASUREMENT, AND CORRECTION

by C. L. Sibbald, P.Ag.,
Consulting Agrologist
Calgary, Alberta.

General

The theme of this brief centers around the fact that the government of the Province of Alberta is now faced with relatively new conditions in terms of:

- an upsurge of coal mining operations and leases on the one hand, and
- an antagonistic reaction from some sectors of the public on the other hand.

As a consequence of this, new guidelines have had to be drawn, and more are needed. New tools must be used in detecting, measuring, and correcting soil and vegetation damage, as well as water pollution where such problems exist.

Detection and Measurement

There have been important advances in instruments used to detect and measure damage, or potential damage. A number of these are electronic, and though expensive to purchase, often monitor conditions automatically so that operator cost is minimal.

Air photo quality has also improved greatly in the past few years; advanced techniques of photo interpretation, particularly infrared photos, now permit accurate detection and measurement of damage, when combined with a small amount of "ground truth" activity.

Soil and vegetation surveying and testing is still carried out, in the main, for commercial purposes only, eg: fertilizer tests of soils, nutritive tests of forage plants for animal feed. More sophisticated analytical methods are needed for environmental problems. Professional, independent, laboratory facilities should be encouraged to adapt to this new situation.

Legislation in Alberta should continue to encourage the expansion and use of equipment and services as described in this brief. Furthermore, our schools, colleges and Universities should expand the teaching skills needed in using such equipment and providing such services.

Correction

In applying corrective measures, the following practices should be considered:

1. Known research techniques in both grassland restoration and in reforestation are, as yet being used only sparingly by government and industry. As well, there

is a general lack of research in the development of fast-growing strains of grasses, shrubs and trees. Our technical and professional capacity to meet this challenge is strong; we need only to redirect some of the manpower resources which may presently be employed in commercial pursuits. There is no reason why we cannot speed up restoration of vegetation by 30% to 40% in some cases.
A systematic approach toward finding methods of shortening the time span between damage to soil or vegetation, and its restoration, would promote greater public acceptance of mining operations.

2. Infrared photography is a very useful tool in measuring the restoration time span for one technique or strain of plant against another. It also serves to identify the effect of improved restoration practices on abatement of pollution in streams and rivers within a watershed.
3. In meeting the challenge of restoration, each situation should be treated separately as much as possible. Vegetative cover varies greatly from north to south and east to west in Alberta, as well as at different altitudes in the same geographic location. Effective action in one place may be ineffective in another.

4. The building of roads is a major problem in many scenic areas of Alberta. Much greater care should be taken to prevent soil erosion. Governments must share the blame with industry because a number of our worst situations are on Crown land or municipal roadways. Some resource exploitation plans call for more roads than others. Where practicable, both government and industry should opt for fewer roads, and the restoration of temporary roadways in the shortest time.
5. There is a distinct lack of understanding of the complexity of ecosystems by many people in Alberta. It will not be possible to solve many of these biological and environmental interactions quickly. First, it is necessary to build a background of understanding through continued and expanded research. To accomplish this we need in Alberta, above all, a good supply of manpower that is skilled in both biology and mathematics, the so-called biomathematicians.

   The complexity is underscored by a statement in Dr. K. E. F. Watt's textbook entitled "Ecology and Resource Management". He outlines the efforts to control the lamprey _Petromyzon marinus_ in the

Great Lakes by mechanical traps, electrocution and with selective larval lampricide chemicals. Despite the large amount of money spent on researching the problem and developing these solutions, it seemed probable that weather conditions regulated the pest most effectively in the end. Researchers tended to claim victories from the use of one or more of the man-made control methods, only to find an upsurge of lamprey populations when the weather again became favorable. Similar situations affect all of our biological research, and this fact must be thoroughly understood.

6. There should be a system of zoning for multiple-use resource exploitation. This, too, is a complicated undertaking. At present, because the Canada Land Inventory is all we have, too much decision-making is based upon it. C.L.I. is too general, and those using its resource inventory data as a base are forced into too many subjective decisions. Once these subjective decisions appear in a report, there is a tendency for legislators to believe them. It is then that Alberta could get trapped by poor legislation in the field of resource management.

7. When planning the future of this, and other environmental matters, there should be a worthwhile overall, systematic approach developed for detection, measurement, and correction of problems. It should not be tackled piecemeal.
8. Several exploration companies are hiring professional and technical advisers, from private firms and Universities, on a part-time basis to research environmental problems. At least one such group of advisers to one company reserves the right to publish information which they find. Disclosures of this kind can be beneficial to resource management, and other companies should be encouraged to follow suit.

Respectfully submitted,

C. L. Sibbald, P.Ag.

6.7

THE FUTURE OF COAL MINING AND RECLAMATION IN ALBERTA

by Terry McKay

Policy Chairman of Zone 2 affiliate clubs of the Alberta Fish and Game Association which are the Alberta Arms and Cartridge Collectors, Brooks Fish and Game Assoc., Calgary Fish and Game Assoc., Communications Employees Fish and Game Assoc., Hook and Hackle Club, High River Fish and Game Assoc., Hanna Fish and Game Assoc., Michichi Fish and Game Assoc., Outdoor Sportsman Assoc., Prairie Pointer Club, Sarcee Fish and Game Assoc., Tilley Fish and Game Assoc.

Presented to the Environment Conservation Authority
on December 21, 1971

INTRODUCTION

As the ECA has noted in its' introductory prospectus,[12] Alberta can expect to see a continuing increase in surface mining over the next several years. The demand for more electrical power and more coking coal will be major factors in the expansion of surface mining. In addition to these two factors, a third exists that may surpass and probably will eclipse the demands on coal for electricity and coking purposes today. That factor centers around the role coal will play in meeting the oil and gas shortage on the North American continent.

The purpose of these hearings is to formulate a consensus of public opinion regarding the reclamation of surface mining. The consensus will be used in writing legislation about reclamation. It is necessary that this legislation apply to mining practices tomorrow as well as today.

The purpose of this submission is to describe the mining practices of tomorrow. They will not be just enlargements of today's mining. These practices will be completely different in size as well as technique.

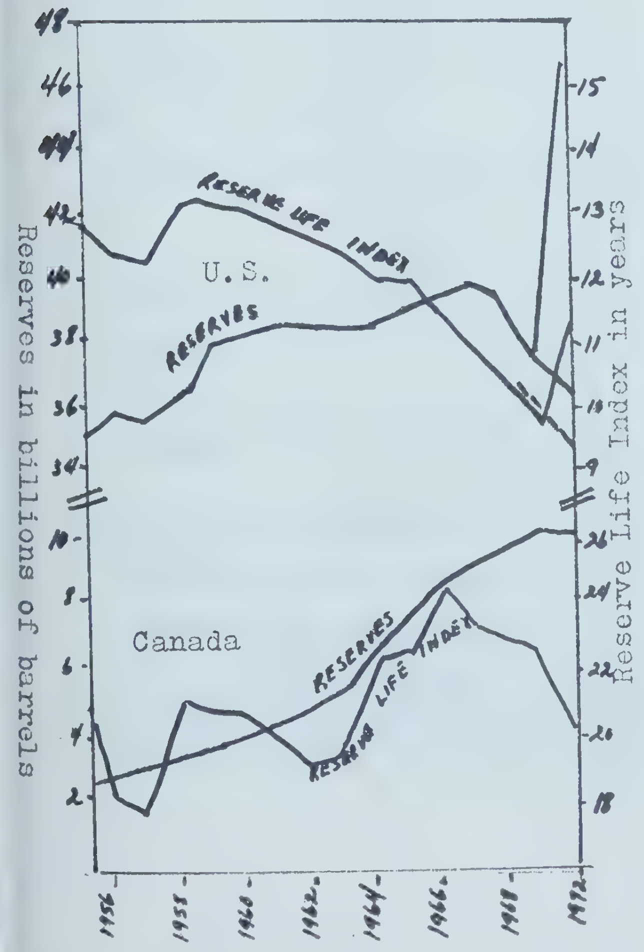
This submission will quickly review the present energy shortage of the North American continent and show how coal, of which Alberta has large quantities, will meet this shortage. A moment will be spent examining the new technology of coal liquifaction-gasification, how it will meet the energy shortage, and how it will make present coal mining in Alberta seem trivial in comparison.

Finally the brief will make reccomendations as to post coal removal activity. These will be specific in nature and objective in scope. The reclamation procedures and regulations of tomorrow, because of increased surface mining activity, cannot be as lax as those of today. If coal is to become the cornerstone of Alberta's energy supply, it is imperative that the environmental impact of surface mining be lessened.

1. You say in the introduction, that coal will be the major energy source of the future. Is North America getting short of oil and gas?

Yes. It is true that more oil and gas are being found. But, at the same time, more oil and gas is being used, both in Canada and the United States. Demands in the U.S. will hasten the depletion of natural gas reserves in Canada. Late decisions by the National Energy Board support this statement. A recent application to export an additional 2.7 trillion cubic feet of gas was refused on the grounds that Canadian reserves might be jeopardized.

Fig. 1 North American Petroleum Reserves



(........excl. Alaska)

If consumption continued at current levels, serious strains on productive capacity could emerge in the absence of any new discoveries. Thus, despite the impact of the 10 billion barrel discovery on the north slope of Alaska, known U.S. reserves of petroleum represent not much more than 11 years supply at current production levels.

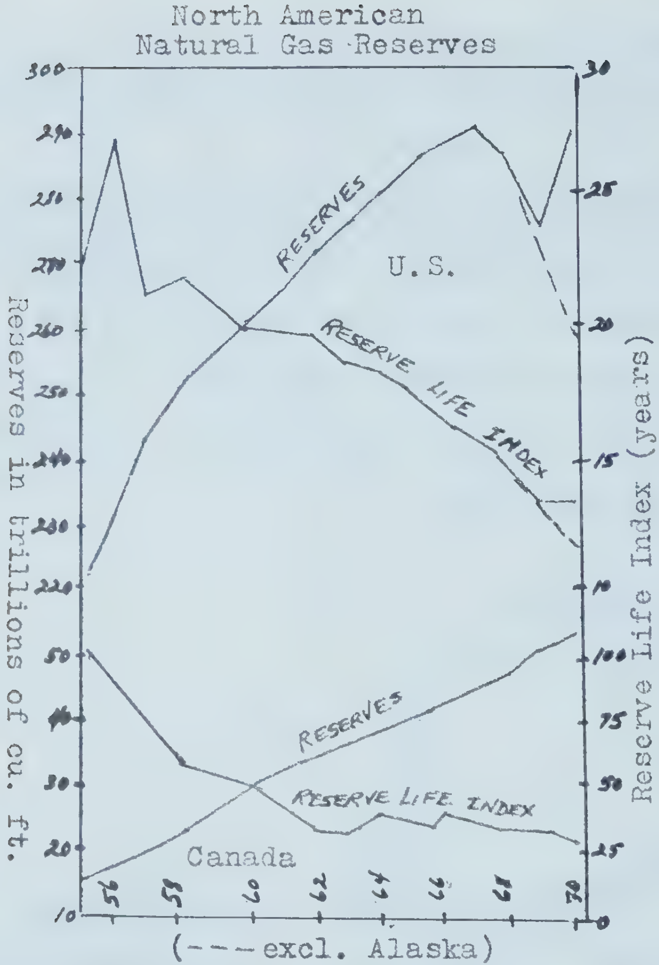

North American Natural Gas Reserves

Fig. 2

The reserve life index[1] of U.S. natural gas is rapidly approaching the 10 year level, below which (fig. 2) it is generally felt pipeline deliverability and flexibility cannot be maintained. Canada's reserves are roughly equivalent to 20 years supply of petroleum at present consumption levels. Contrary to Canadian Petroleum Association estimates, several people in the industry[7,8] have voiced pessimism about the chances of finding elephant fields in the future to offset this decline.

2. Why is there a shortage of oil and gas?

The oil and gas deficit was caused almost entirely by the U.S. and was largely the result of an increased demand for electric power[2]. Much of the deficit has also been caused by household, commercial and transportation applications rather than industrial ones. It is interesting to note that if the U.S. consumption of energy for electrical power generation rises 25% by the year 2000 as is expected, then it's generation will account for between 43% and 53% of the U.S. gross energy consumption. Similiar figures apply in Canada.

The conversion of railroads to diesel engines, the extension of gas transmission lines, the explosion of the U.S. automobile population, and the expansion of the nation's fleet of jet aircraft all accounted for an increase in petroleum consumption[5]. The demand for cleaner air has also led to the substitution of natural gas or low-sulphur fuel oil for high suophur coal in many power plants.

The shortage of oil and natural gas occured at a time when political developments in some major oil producing countries placed uncertainty on the dependability of a large portion of world supplies. This has led to decreasing continental oil and gas reserves, and to increased attention to a continental concept of energy supply.

3. What does this oil and gas shortage mean for Canada and Alberta?

While Canada and Alberta have energy reserves capable of meeting continental requirements well into the future, it is certain that Canada as well as the U.S. will run out of conventional oil and natural gas. Additional forms of energy must then be sought. Most of this energy lies in Alberta in the form of tar sands and coal. So the energy shortage in Canada means more exploitation of Alberta's solid fossil fuels.

4. Can nuclear power be harnessed to fill the energy gap left by oil and gas?

Nuclear power is the most promising of all energy sources There are different types of nuclear reactors. However, the only reactor that has technically proven itself is the fission reactor. Major problems of this type of reactor are thermal pollution, possible radiation leaks, and a lower efficiency rate than that of coal fired power plants. It is safe to assume that nuclear power will account for a large segment of U.S. electrical power by the 1980's. The application of a nuclear power plant in Western Canada is unlikely for the next decade at least and for Albert it may be several decades.[3]

While nuclear power may be used in electricity production, present technology does not permit it to be used in transportation, industry or commerce.

5. What about hydroelectric power?

Most of Canada's low cost hydro sites have been developed so that future additions will either have to be remote from load centers or more costly sites closer to the load center. The high cost of capital has caused considerably more attention to be given to the lower capital cost, coal fired thermal plants.[3]

6. If coal is the answer to the energy shortage, how will it be used?

Coal will be used extensively in three ways. It will be used in the production of electricity, the production of steel (coking coal), and the production of synthetic fuels. The first two uses of coal are well known. The last utilization of coal will provide the transport, commercial and residential markets with the much needed synthetic natural gas and petroleum products. It is doubtful that a major change in technology will be developed before the end of the century to allow the use of another type of energy in these sectors.[6] Liquifaction and gasification of coal seem to offer, long range, the most certain available domestic supply of both liquid petroleum and pipeline gas.

This prediction, particularly the reference to pipeline gas, throws much consideration on a recent estimate of the Future Requirements Committee of the U.S. They say that the U.S. will require 54.9 trillion cubic feet for use in 1995. This is 2.5 times the total gas use in 1970 or an average annual compound growth[9] rate of 3.8%. The emphasis on 'clean' fuels is considered the most important single factor in this increase. U.S. coal has large quantities of sulphur in it whereas Alberta coal is relatively free of sulphur.

7. What about the Japenese demand for coal; will it increase?

The long term contracts for metallurgical coal from Canadian deposits seems to have satisfied the recent large growth of primary industry in Japan. A slower growth rate can be expected as Japanese industry expands into the secondary manufacturing phase. But demand from Japan for high quality Alberta coking coals will still increase.

8. Coal liquifaction-gasification is something new! How does it work?

There are three[4] basic methods of coal gasification. They are (1) pyrolysis, (2) hydrogenation, (3) gasification-methanization.

Pyrolysis involves the direct application of heat to the coal and the subsequent driving off of the volatile matter.

In hydrogenation or hydrogasification, externally produced hydrogen is added directly to the coal substance under moderate temperatures (1200 - 1350°F) and elevated pressures (50 - 200 atm.) to form Methane gas and other hydrocarbons.

Gasification-methanization is a dual step process, making synthetic gas (H_2 - CO mixture) and catalytically upgrading it to CH_4 (Methane).

9. Why would a coal liquifaction-gasification plant be located in Alberta?

Increases in production and processing costs of natural gas have been contributing factors to extensive research in making synthetic fuels from coal. Coal conversion plants become economically feasible when large coal beds are traversed by natural gas transmission lines, when a large steady supply of water is available and when the coal is relatively sulphur free. Alberta meets all these considerations.

10. How much do synthetic fuels cost?

Mining costs are a critical factor in the development of the synthetic fuel industry. Assuming that the cost of mining raw materials for conversion plants is a major portion of the total processing cost, commodities can be ranked in order of feasibility for processing. (fig. 3)

The oil shale figure quoted in fig. 3 applies only to mining costs that have been lowered because of economies of scale. The process of oil shale conversion has many problems. One is that large amounts of oil shale are required for conversion plants. Another is the fact that only a small portion is extracted from the oil shale. Nearly all the shale remains to be disposed of after processing. To make matters worse, the shale 'swells' by about 1/3 as a result of crushing and processing so that there is a larger volume to dispose of than originally mined.

Another problem is that oil shale varies in quality as to the depth of the basin. Still another problem is that the oil shale formation in the Piceance basin in Colorado dips (3-10°) towards the center of the basin. This means very expensive hauling mechanisms must be used to remove the shale.

Regarding the cost figures, coal conversion is the most economical process after the tar sands process. Several pilot plants have been in operation in the U.S. and it is felt that a full scale plant will be in operation there by 1975.

11. Is the scope of a coal conversion operation very large?

The unique characteristic of mines that supply feedstock to coal conversion plants is their size. Some 15,000 to 50,000 tons of coal are required to make 50,000 barrels of synthetic crude oil. The coal reserves needed to supply a plant of this daily capacity for 15 to 20 years are huge. To remain economical, coal properties 40 square miles in

COMPARISON OF MINING COSTS

Deposit	Mine	Total cost $/ton	Recovery bbl/ton	Product $/barrel
Athabasca tar sands	Surface	0.32	.5	.64
Colorado oil shale	Underground	1.00	.84	1.19
Estonian oil shale (USSR)	Surface Underground	n.a.	n.a.	n.a.
North Dakota Lignite	Surface	2.24	1-3	.75-2.25
Wyoming bituminous	Surface	2.30	1-3	.77-2.30
Illinois bituminous	Underground	4.20	1-3	1.40-4.20

fig. 3

COSTS FOR SYNTHETIC GAS FOR VARIOUS PROCESSES IN CENTS PER mmBTU of PRODUCT GAS

Process	Illinois #6 coal	Pittsburgh seam coal	Renner Cove Lignite	Elkol Subbituminous
BCR	64.3 (N)		(N)	(N)
M.W.KELLOGG Co.	(N)	71.4	(N)	(N)
IGT electrothermal (1)	62.8 (N)		(N)	(N)
IGT electrothermal (2)	56.4		56.2	44.0
Steam-iron	58.4		58.2	45.6
CO_2 acceptor	(N)		55.7	45.2

- prices given are 15 year average
- (N) means the process was judged to be non competitive
- (1) with power for reaction heat purchased from a char burning, conventional power plant
- (2) with power purchased from a char burning, magnetohydrodynamic power generating plant

fig. 4

size with a 6 foot seam must be blocked out.

The problem[13] will be much more severe for 100,000 b/d plants. Similiar consideration apply to coal gasification plants.

* * * *

It can be shown then, that surface mining in Alberta will increase. This increase may be small or negligible in some sectors of the province; in other areas there will be much increased activity. The size of strip mines will get larger and larger. The problems associated with mines will also become larger. It follows that reclamation must be immediate and thorough to prevent these large problems from occuring. The following are specific reccomendations for reclamation.

1. The removal, storage and replacement of overburden and topsoil is the basic physical operation of the reclamation process. Not enough attention has been paid to the time span involving this process in Alberta. This neglect has been partially responsible for the siltation of rivers in the province. As a consequence, game fishing suffers in varying degrees.

An indication of how surface cover and slope affects soil erosion is given by a recent study in the Steveville Badlands of Alberta. It was found that sediment yield was doubled if the slope angle was doubled. It also was found that a bare slope of 1° gave a very high sediment yield compared to a vegetated slope of 25° (negligible yield). These two observations point out two areas that need attention in reclamation activity. Slope of a spoil pile directly relates to the amount of soil erosion on it and surface cover of a spoil pile directly relates to the retardation of soil from it.

To eliminate as much erosion as possible it is reccomended that all spoil piles and banks of overburden be seeded immediately with a cover crop of some kind. To ensure establishment and growth of this ground cover it is reccomended that no slope be allowed at an angle greater than the angle of repose[11] (33°).

2. With spoil banks relatively erosion free because of vegetation on them, (the ground cover growth must be fairly vigorous to ensure maximum soil protection) a time limit can be set as to when replacement of the overburden must take place. Ideally, a maximum time limit would be 6 months. This period of time would allow coal companies to use men and equipment already in the immediate area for reclamation.

3. Reclamation plans should be made well in advance of the commencement of strip mining. A bond should be posted by the operator of the coal lease to snsure that reclamation take place. The original contour of the land should be retained wherever possible.

4. Some areas[10] of this province, notably high mountain areas, are not suited to reclamation. Vegetation grows very slowly at these altitudes. It must be recognized that this problem exists. Areas of the province that cannot be reclaimed should be exempt from strip mining. A survey of high mountain areas should be taken to establish what areas can and cannot be reclaimed.

5. The construction of roads, trails, stream crossings etc. must be kept to a minimum. Areal land consumption is greatly

increased by these factors. It is reccomended that a certain amount of money be allowed to be spent, or a certain amount of mileage allowed to be built when the question of road building arises. This practice would encourage the coal industry to get maximun usage out of exixting roads. The system works well for the seismic industry in Alberta. It should work as well for the less mobile coal industry.

6. Transportation and processing of coal have been dealt with earlier in this brief. The trend to reduced transportation by building coal processing plants at the mine mouth will continue. It is reccomended that this practice be encouraged.

7. Finally, it is reccomended that the new legislation incorporate all previous reclamation legislation within it. The new legislation must spell out precisely what any limit will be and what any default penalties will be. These two measures would be instrumental in lessening the environmental impact of strip mining in Alberta.

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6.8 THE ENVIRONMENTAL IMPACT OF SURFACE MINING IN ALBERTA

Presented by: P. E. Fuller

Although nothing set forth here is new, I do wish to place on record my concerns regarding this important subject.

Three very important revelations, to my mind, were forthcoming from the public hearing held in Calgary. Firstly, that the percentage of the total coal reserves in the foothills and mountains of Alberta that is amenable to strip mining is so low. Secondly, that the employment possibilities of strip mining, both present and potential, are so small; not completely inconsequential, but nevertheless not of major impact on total Alberta employment. And thirdly, that no company engaged in strip mining will voluntarily spend one dollar on surface reclamation but only such amounts as are necessary to discharge legal obligations. The "good corporate citizen" position put forth is basically a sham, as evidenced by the lack of any reclamation activities performed voluntarily.

Strip mining in prairie habitat can be tolerated but only if stringent regulations concerning land reclamation are enacted and enforced.

In the foothills and mountains the necessity to carry out strip mining has not been proved. It may be cheaper and hence generate better profits but in absolute terms it is not an essential activity. Therefore, I would support a total ban on strip mining in these environments. If this stance is unacceptable to the Authority, then certainly open-cast mines should be restricted to the immediate vicinity of those areas where mining operations are presently carried out. And in these areas only those sites which can be reasonably reclaimed should be opened. Reclamation must be reasonable on a multi-discipline basis. Reforestration preservation and/or formation of wildlife habitat, prevention of either physical or chemical contamination of air, water or land, and esthetic acceptability of the finished job are but a few considerations.

In any event, no strip mining can be allowed to go forward on the basis of promises of future reclamation. Nor are legal obligations enough in themselves. The people of Alberta must be completely protected from all "legal" devices such as mining the resource in the name of a provincially incorporated wholly-owned subsidiary and then when the deposit runs out have the parent raid the treasury, declare the subsidiary bankrupt, withdraw beyond provincial jurisdiction, and leave the mess. The monies sufficient for reclamation must be under the control of the provincial government before operations start. If the coal operators find this too onerous, then good riddance.

3500 Fulton Street, Apt. 14
San Francisco, Calif. 94118
U. S. A.
December 25, 1971

6.9

RECEIVE
DEC 30 1971
ENVIRONMENT CONSERVA
AUTHORITY

Environment Conservation Authority
9912 - 107 Street
Edmonton, Alberta
Canada

Gentlemen:

I have learned of hearings relative to the environmental impact of surface mining in Alberta, and, as a sometimes visitor to and an admirer of the province of Alberta, would appreciate the opportunity to make a few comments.

I am not an expert on the subject of mining, nor on the means of reducing the impact of such activities. However, I have seen the effect of operations of that nature on the land elsewhere, and do realize what it will mean to Alberta. I am an amateur ecologist of some experience in judging land quality and the overall, long range effects of various activities on the differenct types of land formations. I have been very concerned as to the potential of strip mining in Alberta as well as in adjacent portions of the United States. Although it is clear that a substantial economic benefit to the immediate area will result, on a short term basis, it is questionable whether the environmental damage done might not, over the long term, result in an even greater economic loss. Certainly there would be substantial immediate impact on the existing ecosystm, perhaps to an unacceptable extent. Too much disturbance of existing ecosystems is likely to have a serious and deleterious effect on human life.

Whether or not measures could be taken to reduce this impact to a tolerable level or to take corrective action to restore an area to a condition approximating its state prior to the exploitive activity is a key point in determining whether any such activity can be permitted. The philosophy behind the proposed legislation as described in the position statement prepared by the Department of the Environment which will place the responsibility for environmental protection on those who desire to develop a particular resource, and would establish the theory that such development is a conditional privilege rather than a right, is a major step forward in essential protection of a liveable biosphere, and should serve as a model elsewhere, and for all proposed development. It will serve any area poorly to receive a substantial economic return from resource development, but on so doing, destroy the basis of life in the region. Only when it can be clearly shown that the means of protection of soil, watershed, and vegetation, and thereby also wild-life are not only feasible, but will be utilized, can such activity be permitted. If adequate restoration after resource development activity has tsken place is possible, such development could also be permitted, if interim damage is not substantial.

The effects of strip mining on the plains may well be more apparent than elsewhere. However, I am pleased to note the realization of the serious effect of such activity on the foothills and mountains. Much of the damage there is less immediate obvious, but watershed destruction may well be more permanent and more damaging than any other effect. The watershed, as the supplier of the life-blood of the province and beyond, must receive priority in any consideration. The effect on the scenic quality is, of course, massive, in any case, and could well have a major effect on the tourist's desire to visit, as well as to discourage the citizens of Alberta.

The approach taken by the Environmental Conservation Authority seems excellent, nd I hope that it is adopted. Until it is possibke to meet the necessarily strict tandards proposed for any surface disturbance I hope that any strip-mining, vegeative removal for any purpose including forestry activities, dam-building and other uch activities, and any other measures which would have significant effects on the urface of the land and the water table, will be restricted.

Thank you for taking these views into account in consideration of future egislation.

Very truly yours,

Francis J. Walcott

COPY OF LETTER FROM: MR. ROBERT E. KELLY

11033 - 89 Avenue,
Edmonton, Alberta
December 27, 1971

Secretary,
Environment Conservation Authority,
9912 - 107 Street,
Edmonton, Alberta.

Dear Sir,

Regarding briefs requested on the subject of strip mining in Alberta; I hope my letter is not overdue, but wish only to express concern.

My familiarity with strip mining is very limited. Limited, in fact, to its aftermath. All I really want to say is that I have never seen anything so absolutely ugly as a strip mine, exhausted and left for nature to repair the wounds. Any such mining allowed in Alberta should be required to reclaim the land aesthetically and ecologically, even if nothing more is done than turning pits into lakes or valleys.

Try to preserve the natural beauty of Alberta intact, and hide, remove the ravages of strip mining.

Yours truly,

ROBERT E. KELLY

6.11

COPY OF LETTER FROM AILEEN HARMON, BANFF, ALBERTA.

I was present at the strip mining hearings in Calgary; one of the Bow Valley Naturalists from Banff.

This is a belated letter to say that I felt the hearings were very well conducted. I was impressed with the questions you asked and I realized that you were looking for facts to support some of the points raised on problems in the mountains. I am sure you were dissappointed in the lack of such facts. However, what perhaps may have looked like fuzzy argument was I believe, really due to lack of available information. Some aspects are becoming fairly obvious but we do not have research to confirm. We do not know enough yet to solve these problems. Perhaps we should go slow in these areas until we know more.

Some of us visited the Ribbon Creek Mine, a small operation above the west side of the Kananaskis Valley which has closed down. Seeding had been almost a total failure here, presumably done on the slag heap directly. I feel that the Canmore operation is making a real effort and they make it on the flatter areas but I think it will take a lot more work and money than they anticipate. The mining of the peat from nearby bogs disturbs me, since this is part of the mountains fire protection system and their richest areas biologically. As you know, soils on mountain sides are normally poor and shallow, so that forest regeneration may be very slow. They are doing the best job they know how to do, but will it be good enough?

The other point that I felt was not adequately stressed, was the damage caused by indiscriminate and ill-controlled exploration for coal. I am not an authority on the subject certainly, but I have talked to a number of people who have been in some of the areas, and the damage done by bulldozer roads, ditches, and pits, I have seen pictures - is really a shocker. I feel that this aspect requires new techniques and rigid controls to protect the high foothills and front ranges of the mountains. I am sure you have a full record of the devastation in the Swan Hills as a warning of what can happen with uncontrolled bulldozing.

Another aspect of what might be called strip mining, not dealt with in the hearings, may be seen all too well in the Bow Valley east of Exshaw. I am speaking of the lime plant. Their method of heaping slag, or whatever it is called, on the landscape leaves much to be desired. What can be done about this one? I have also heard that the pollution control on the stack at Exshaw is not always in operation; however, I have no firm information on this and could be wrong.

I know I have told you nothing in this letter that you do not already know, but I felt that I had to make one or two points that I believe are important to the whole picture.

6.12 PROPOSED STRIP MINING LEGISLATION FOR ALBERTA

A Brief Submitted to the Environment Conservation Authority of the Government of Alberta by the Federation of Western Outdoor Clubs.
December 30, 1971

The Federation of Western Outdoor Clubs is an organization of some 170,000 members, organized into some 50 outdoor-oriented organizations in the western United States, from Utah to Southeast Alaska. The Federation was organized in 1932, and has played an extremely active role since that time in the long-term effort to conserve and protect the scenic, wilderness, and other environmental resources of the western United States in particular, and of the nation as a whole. Although no Canadian outdoor organizations are presently members of the Federation, numerous individuals are, and they have brought to our attention the proposed Strip Mining-Surface Reclamation Legislation, now being considered by the Alberta Provincial Government.

We hope that this brief can be accepted as a statement of the concerns, comments, and suggestions of a large number of fellow North Americans who know and love the Province of Alberta, and who have experienced both strip mining and efforts at regulatory and reclamation legislation for a number of years in the United States. The author of this brief is the Federation's duly authorized representative, speaking in behalf of the Federation on all matters affecting Northwest North America; he has traveled by car, by foot and by plane nearly all of the Rocky Mountain Front of the Province of Alberta, including the foothills area, from Waterton Lake on the south to the Willmore Wilderness on the north.

In our opinion, momentous issues of deep and lasting importance are at stake in this legislation. The country involved, particularly the foothills and the mountains, is some of the most beautiful and serene in all of North America. These are the recreation areas for the increasingly crowded urban centers of Alberta, and are magnets of attraction for the substantial tourist industry of the Province, much of which comes from south of the international border. The plains, where are located the other substantial coal fields—contain some of the finest agricultural land in North America. Altogether, the lands to be affected either by mining or legislative measures dealing with it are extremely important and significant.

We have seen the Grassy Mountain stripmine near Blairmore, a pit abandoned for many years with no reclamation; and we have seen the pollution from an abandoned coal mine of McGillivray Creek near Coleman—just two examples of what uncontrolled mining has already done to Alberta. Just across the British Columbia border, in the once beautiful and pristine Elk Valley, we see a portent of what is to come. Monstrous coal stripping machines, whole mountainsides torn away and deposited in the valley below, streams destroyed and the character of towns changed forever.

There is indeed a great deal at stake.

Background - Effects of Strip Mining in the United States.

We sincerely hope that legislative decisions in Alberta will be strongly influenced by a careful observation of the destruction caused by this activity in various regions of the United States, both past and present. The Appalachian region is an obvious example of an area which has suffered damage beyond repair--both environmental and economic--due to the use of this terribly damaging mining practice, a practice which becomes more damaging each year with the development of larger earth-moving equipment. In 1967, the U.S. Department of Interior issued a study, "Surface Mining and our Environment," which stated that, as of 1965, 3.2 million acres of land in the U.S. had been rendered completely unusable. Since then, that amount has about doubled; and the same damages which have occurred in Appalachia are about to occur in the states of Montana, Wyoming, and North and South Dakota--all quite similar geographically to Alberta, and none of which has proven strong surface mining reclamation laws.

The technology of strip mining is a primitive one, and should not be cloaked with misleading phrases such as "modern mining techniques" or "updated mining methods." The only technological advancements that have occurred in this destructive method of extracting coal from the earth has been the development of ever-larger machines capable of moving vast quantities of earth. There is a machine in the State of Ohio which can move 22 million cubic yards of earth per day, and uses a 220 cu. yd. bucket.

The strip mining method universally employed is quite simple: (1) to reach the coal seam, move away everything on top of it and indiscriminately pile it up somewhere else;)2) extract the coal from the seam; (3) leave everything basically as is and move to a new location and repeat the process. This is essentially the practice which has been termed "efficient" and "economical" by the mining industry in the United States. To those who collect the profits and need not suffer or live with the awesome consequences, it undoubtably is just that.

However, although this method of mining is simple for the mining companies, the complexity of the ecological and social and economic problems it creates is almost incalculable. When all the material on top of a coal seam is removed, large-scale and permanent consequences result. Usually, the layer of topsoil must be removed, and in many portions of the U.S., layers of limestone have also been taken away. This limestone contains large amounts of acid, which is literally poison to plant and animal life. The erosion inevitably caused by the pile of unstable materials extracted from the top of the coal seam allows this poison to run off into streams, killing fish and having a catastrophic effect on entire ecosystems. These same acids also make revegetation difficult and often impossible; and, of course, the topsoil is scattered and ruined.

Often a layer of poor quality coal called "gob" must be removed before the mine operator can sell his coal to the buyer; this material also creates a disposal problem which has never been handled successfully. The "gob" is often buried in the original scar and covered with a layer of soil, but erosion carries its sulfurous content into streams, causing still more damage.

Finally, the unstable piles of material left from stripping operations have been the cause of landslides which have had on occasions tragic consequences involving property, wildlife, and human lives themselves.

Economic Justification for Strip Mining.

The only possible attempts at justification of the enormous and permanent damages caused to all other resources by strip mining have been made on the basis of economics. It is admittedly probably cheaper in the U.S. and Canada for the mine operator to use the stripping methods rather than the deep mine method. But the reason for this cost difference is that the operator passes on the additional environmental and social costs to the local community, provincial, or federal government. For example, the former Deputy Director of the West Virginia Department of Natural Resources has publicly stated that "the profit of the strip mine operator is in direct proportion to the environmental costs he is allowed by the state to pass along to the community."

Typically, large corporations paint glowing pictures of the economic benefits that their mining operations will bring to communities. The truth is, however, that the average strip mine hires five or six people (much less than a deep mine) and that any economic benefit is short-term construction at the beginning of an operation. After the operations have ceased, the coal companies are richer, and the local communities and governments are poorer economically, as well as having seen all the area surrounding them turn into an ugly, barren, useless land. Even in areas such as British Columbia where there is a mining tax, the amount collected by the provincial government is small compared to the enormous profits of the companies, most of which it is presumed will flow over the border to the United States.

In 1969 in the U.S., the production costs of strip mined coal averaged $3.98 per ton, whereas the cost of producing deep mine coal was about $5.52 per ton. However, all coal sold for $6-8 per ton. From this you can see why strip mine operators claim that stripping is "efficient" and "economical," since they can mine coal for less than a deep mine and sell it for the same price, pocketing the difference in cost. The $3.98, of course, does not include any cost to the mine operator for environmental damage. If the external cost of acid drainage, stream siltation, and loss of topsoil were fully included in the internal cost to the operator, there would be little or no strip mining taking place anywhere. Enforcement officials in the State of Kentucky have publicly admitted that if the political power of the coal industry were not so great as to make Kentucky's laws unenforceable, the enforcement of these laws would cause most strip mining to cease.

Background - U.S. Legislative Experience.

In most of the states in the United States where strip mining is practiced, there are legal restrictions; however, most of these are either weak or are not enforced. They speak of preventing "unreasonable" pollution and revegetating only "where practical." In practice, the coal industry has always been able to have the money to hire dozens of "experts" to "prove" that the environmentally sound course is never "practical" or "economically feasible."

Kentucky, West Virginia, and Pennsylvania have the strongest laws in the country. They require permits and bonding, specific types of back filling to cover coal beds and auger holes. Pennsylvania requires complete regrading of the highwall in bituminous coal fields and requires treatment of runoff water. All states require specific replanting of disturbed surface areas; but the only state where the results of these regulations are even visible is Pennsylvania, and this is largely due to the improved appearance of the regraded highwalls. However, the soils are unstable, which causes erosion and acid runoff still; and even in Pennsylvania it is exceptional to find a mined area that has been put back into productive use. About 99% of all stripped areas still lie barren, and unable to support life, even in these states.

After observing the lack of success experienced even by these states with allegedly strong regulatory legislation, in their attempts to protect the environment against the damage caused by huge earth-moving machines,' one can conclude that the failure is due to two factors. The first is the lack of enforcement of existing laws. The coal industry does exert enormous political power in these states, and had become well entrenched before the laws were even on the books. This is why it is very important for the government of Alberta to move promptly, before large-scale mining of any type begins.

The second factor is the emphasis on specific reclamation procedures to be followed rather than on results to be achieved. No law holds the mining operator totally responsible for leaving the land in the same condition he found it, or even for leaving it in a condition which permits any productive use at all. In effect, all the laws do is make a slight improvement in the appearance of the destroyed land, which often remains just as unusable as before. Thus, the public is deceived into thinking that the environment is being protected. This is also a deeply important factor to consider, and we are certain that Albertans will not be satisfied with such a deception and will demand real environmental protection for their province.

Proposed Remedies - U.S. and Other Foreign Countries.

We understand that in some European countries, miners are required to separate and store each layer of soil and rock as it is removed, and after the coal is extracted, the layers are replaced in the original order, being carefully compacted. This is an absolutely necessary requirement if environmental damage is to be avoided, and should be a feature of any strip mining or reclamation legislation.

If bonds are required, there should be evidence of long-term success of reclamation before the bond is released. Public meetings on a community level also would be a useful tool and provision of any strip mine legislation, since it is the communities which are debased and degraded by mining operations, and it is their land nearby which is destroyed. Finally, no legislation can truly be effective unless it contains within it the power to prohibit strip mining altogether from any areas which are particularly sensitive to ecological or aesthetic disruption.

There is presently a bill pending in the United States Congress which would ban all strip mining within six months after passage, and allow no new operations to begin. It would give operators sixty days to file plans for termination and reclamation of stripped land. The bill contains regulations on possible pollution from deep coal mines, and provides government funds for reclamation of previously devastated lands.

Conclusion and Recommendations.

The provisional statement prepared by the Department of the Environment outlines the philosophy, concepts and principles around which legislation on surface reclamation will be developed by the Alberta Provincial Government. We feel that the government deserves to be congratulated basically for such a statement, and it will be a fortunate province indeed if all of the comments and statements within it are enacted into legislative form--and enforced. The statement of concepts expressed appears to be far more comprehensive than most legislation now found in the United States; it is particularly good in its emphases on prevention of environmental damage, on responsibility of the resource extractor, on the idea of exploitation of resources as a privilege and not a right, and the emphasis on regulations which would include all the phases of resource development which have a disturbing impact on the environment.

If we can, we would only like to suggest the following as additions or clarifications:

1) Section 2.1, the Situation Statement, now makes certain statements that there will be a continued "need for more job opportunities and energy requirements in an industrializing economy." We feel that this statement is essentially unnecessary, at least as it applies to strip mining, which is the subject of the legislation. It would be more appropriate, we suggest, to include a statement about the increased demand and need for our urban populations of high quality environments, not only as sources of recreation, but also as open space and food. These are precisely the values that strip mining destroys.

2) Section 2.5 is commendable in that it makes the use or exploitation of resources a privilege and not a right; we suggest that it might be strengthened further by saying that the privilege can not only be made conditional, but that it does not have to be issued at all, i.e., in extremely highly scenic areas, such as Highwood Pass and the Kananaskis Valley, for example, such activity need not be permitted at all.

3) Section 4.10, dealing with the powers of the minister, appears to grant a rather broad range of powers to prevent physical erosion, damage to the land surface, and damage to the cultural or aesthetic values of the same. We wish to stress how important this is, and hope that it is clarified to plainly mean that the minister can, where he deems appropriate (and presumably after public meetings or hearings), prohibit or prevent any mining of any type where these values are more important than mining values. We feel this should be a fundamental requirement of any effective regulatory legislation--the right to say no.

4) The provision for a security deposit (bond) is most commendable; the only suggestion urged that it be made high enough to be meaningful.

All too often in the United States, provisions for bonds have been set much too low to truly permit effective reclamation. It can cost many hundreds of dollars a day to run a bulldozer, and that may not be sufficient to completely reclaim one acre of land, for example. The security required to be posted should, depending on the circumstances, be at least $1,000 an acre, and probably more in most places. And, evidence of the success of long-term reclamation should be furnished before the bond is released.

In sum, we feel that the best possible position to take is to completely ban and prohibit all forms of strip mining, anywhere and for whatever reason. The damage which it causes is easily documented, and has caused much suffering and devastation in the United States. It has been so bad that the Sierra Club and many other individuals and organizations have formally adopted the position that there should be no strip mining tolerated. It does cost more from the mine operator's standpoint, but it costs the community far less to have deep mining instead of strip mining.

What has occurred in Alberta so far is up to now only a hint of what is to come. As earth-moving machinery becomes larger, it becomes more and more possible to rape the land to the absolute limit. The machine in Muskingum County, Ohio, is capable of moving 22 million cu. yd. of earth per day, and can remove as much as 185 ft. of overburden from a coal seam. In British Columbia's Crow's Nest Pass area, Kaiser Coal Ltd., a subsidiary of the U.S. company, plans to remove overburden to depths of 480 ft. One can imagine only with difficulty the destructive capabilities and immense size of a machine which will perform this frightening task. Strip mining in the future will be able to literally disembowel foothills and mountains beyond recognition.

When Albertans and British Columbians look at the terrible results of strip mining in the United States, they should be forewarned. But they must not imagine that similar destruction is in store for these provinces. They must instead look at the eroding scars, acid streams, mammoth piles of poisonous wastes and poverty-stricken communities, and multiply them a hundred-fold.

This, we submit, is what will happen, if preferably prohibitory legislation is not adopted, or at the very least if the strongest possible regulatory and reclamation legislation is not adopted. We urge you to move promptly.

Thank you for the opportunity to submit this brief.

Respectfully submitted,

Brock Evans

Brock Evans, Northwest Representative
Federation of Western Outdoor Clubs
Seattle, Washington

OPY OF THE LETTER RECEIVED FROM:

Central Alberta Big Game
Trophy Club

HEADQUARTERS AT OLDS

6.13

Olds, Alberta
January 15, 1972

Dr. Walter R. Trost,
9912 - 107 Street,
Edmonton, Alberta

Dear Sir,

We the members of the Central Alberta Big Game Trophy Club would like to present this brief in a hope of preserving at least part of the areas destined to be strip mined. We are concerned with the Bow and Clear Water Forest Reserves. The following are a few reasons why we feel so strongly on this matter.

The coal in question is located in the foothills that lay just east of the Banff Park boundary. The elk herds that summer in the park are forced out into these foothills in the early winter by deep snow and a lack of feed. The bare grassy hillsides provide feed for these animals all winter. The prevailing winds keep the ground bare and the elk feed with no trouble at all. The sheep also use these same hills, the ewes and lambs live on them the year round, and the rams join them in the fall.

The corridors or passes out of the mountains are used by these migrating animals. These open hills are right where they should be. As the elk come out of the park they merely start to climb the hills that are located there, and feeding is no problem. These hills are far too valuable in their present form to ever be destroyed.

You can see how vital this area is to our wildlife. Some say, there are thousands of hills in the west country, let the game use some of these, whats the difference. We'll tell you what the difference is. No other hills are open and provide grass, nor are they located as these hills are. You can stand on the top of Dog Rib Hill for instance and look over hundreds of hills that lie east and south and all you can see are hills that are timbered over from top to bottom. They are anything but good elk or sheep range, and besides that they're located in the wrong place. We must keep those hills intact that provide winter range for a herd of over a thousand elk and several hundred sheep. We cannot stress this point too strongly.

No matter how tough you make the new land reclamation act, there is no way these hills can be put back into their original condition, once they have been ripped apart. This wildlife range will be lost forever, and the wildlife in this area will meet the same fate. We ask you to consider this and not allow any strip mines to start up in this area.

Central Alberta Big Game
Trophy Club

HEADQUARTERS AT OLDS

When the top half of a hill that is eight thousand feet above sea level, is pushed over the edge down into the valleys it is bound to expose a tremendous amount of bare dirt and coal slack. The pollution this will create is obvious. The drinking water for towns and cities down stream must be considered, to say nothing of the fish in these waters.

We also question the Government for subsidizing the coal companies ninety cents a ton to help these companies show a profit. We claim that if there is no money to be made mining coal without Government aid, then don't mine the coal, leave it alone. Why should Albertans be made to pay this sort of welfare to help some outfit satisfy its greed. We don't believe the coal companies care what they do to our environment, or that they are trying to create jobs for Albertans. Why then are they importing Japanese laborors and asking for a more lenient land or surface reclamation act, if this was the case.

When the Environment Minister drafts his new surface reclamation act, he should not only listen to the coal companies, he should also listen to the other side. We urge him to draft an act that is strict enough to force the mining companies to clean up their mess completely, including the roads they put in all over the country while exploring and testing for coal, and then plant a new growth on this land and maintain it until such time as it can take care of itself.

Warnings of higher electricity charges should not be used to con the Minister into making the new act more lenient. The argument they are using, that they will be stripping only a tiny fraction of Alberta, and by this fact, claim it is not harmful and also claiming that mining will only have a temporary effect on the landscape is absolutely ridiculous.

Someday in the future a road will be built up the Red Deer River into the Park. This will open up a lot of beautiful scenery to the tourist and holidayers. Dog Rib Hill lies just south of the river, it rises several thousand feet above the Ya. Ha. Tinda and provides its share to the beauty of the panoramic view one gets as you drive west into the Rockies. Let a strip mine operate on Dog Rib, and you will be quilty of a deed that is absolutely unforgivable.

The revenue taken by the Government directly from hunting runs into the millions of dollars. This comes from the tax on thousands of gallons of gasoline used by hunters. Thousands of dollars from licenses and liquor taxes. With good game and land mangement, this revenue can go on and on year after year indefinitely and always show a profit.

Central Alberta Big Game
Trophy Club

HEADQUARTERS AT OLDS

Your coal deal, is a once only deal, and a very costly deal at that. When the coal is all gone and your expenses and damage are all tallied up we're sure your books will show a substantial loss.

We urge you to keep what you've got, and you'll be a way ahead of the game in the end. We also question the practice of the Government building railroads for these mines free of charge and letting us the tax payer foot the bill. We feel that if the coal companies want to sell coal let them build their own railroads.

We can remember not too many months ago when you people were asking for our help to oust the Social Credit Government and elect you to be our new Government. Where ever we looked we saw posters with the word NOW in huge red letters, stating that NOW was the time. You made it.

Now we are asking for your help, and we will borrow your slogan, and declare, that NOW is the time.

We hope you will see fit not to let us down.

Yours very truly

Mr. J. O. Paton, President

THE CENTRAL ALBERTA BIG GAME
TROPHY CLUB

984 RECEIVED
JAN 21 1972
ENVIRONMENT CONSERVATION
AUTHORITY

6.14

T. Beck
433 - 33 Avenue N. W.
Calgary 43, Alberta.

Environment Conservation Authority

Edmonton, Alberta.

BRIEF REGARDING SURFACE MINING IN ALBERTA

Creation of the Environment Conservation Authority is an important step in securing good environmental management and I appreciate the opportunity to submit this brief for your consideration.

The Panther - Red Deer Rivers area (Figure 1) is used for purpose of this brief, while at the same time relating this specific area to more general considerations and subsequent recommendations.

T. Beck

January, 1972.

SUMMARY AND RECOMMENDATIONS:

The implications of incomplete planning for resource development are demonstrated in such projects as the Peace River dam or Swan Hills area where serious erosion has already occurred due to industry and Government ignoring the environment (St. Onge, Lengellé, 1971). The Swan Hills problem will no doubt be compounded due to indicated near-surface coal deposits (Research Council, 1970). That the coal industry itself does not have all the answers is partly demonstrated by Kaiser's Crowsnest project requiring more than double the original investment of $87.5 million and still not meeting contract volumes. Bad judgment of overburden removal is cited by Kaiser as one reason (Lawson, 1972).

A brief of this nature should be constructive, but the many unanswered questions raised are perhaps the best indicator of the fact that not enough is known of the long term effects of strip mining on our environment to permit additional exploration and development at this time.

In view of these facts I respectfully request that:

1) The Environment Conservation Authority recommend to Government that a moratorium be declared on exploration and on any new development until all the related costs are completely assessed by independent examination convened by the Authority. This examination should include cost-benefit studies of strip mining alternatives.

2) In the case of presently operating mines, a study should be conducted by the Authority on what is not being accomplished by present reclamation techniques with recommendations to be included in reclamation legislation.

3) National Park boundaries be redefined to include traditional game migration routes. Failing this, impact studies should be performed and considered in future decisions.

A. HISTORY AND ENVIRONMENTAL IMPLICATIONS:

The Panther - Red Deer River area is a traditional and important wintering ground for several species of ungulates. A Government of Canada ranch is operated in part of the area (Figure 1). Large numbers of horses owned by Banff Park outfitters winter in the vicinity. A portion of the area was previously included in the Banff National Park.

Lower Cretaceous coal bearing formations occur (A.S.P.G., 1954) at or near the surface in this area as in so much of our Province (Figure 1).

This formation also supports much of the beautiful flora and fauna with which we are familiar. Populations of elk, deer, moose, bear, man, etc. are the most obvious but are by no means the most numerous, or perhaps even the most important. The same observations would apply to the flora.

Strip mining exploration has been conducted in several locations in the area. One example is located south of the Red Deer River at a point four miles east of Banff National Park boundary and adjacent to Warden Rock Mountain (Figure 1). At this location test cuts were bulldozed on the same mountain used as wintering grounds by Rocky Mountain sheep (Figure 2). This migratory band of sheep spends part of each year within the Banff National Park. It is not difficult to predict what their fate must be if a strip mine traverses their traditional migration route, assuming there is any alpine tundra left.

On February 19, 1971 I observed from one location on Scalp Creek in excess of 100 mountain sheep on various slopes around the Federal Government ranch, including 21 on the mountain described in Figure 2.

What other less obvious organisms would be affected? I suggest that without further study no one knows the complete answer.

A problem of this type could be avoided by adhering to natural boundaries when creating future parks.

B. RECLAMATION:

To some extent it has been demonstrated that land restored after strip mining will support additional populations, particularly elk. The official Government publication "Alberta, A Land for Living" (1969) states:

> "One of the more unusual and delicate natural habitats in the Province is found on the higher slopes of the mountains, where it takes a thousand years to form an inch of soil necessary for the vegetation that supports the unique and relatively rare animal wildlife found in such areas".

Surely no one would seriously suggest a duplication of natural cover, such as alpine tundra, could be achieved with seed purchased from a commercial vendor. Our famous "prairie wool" has not been duplicated despite the undeniable expertise developed in agricultural Alberta. Much more research is needed in this area before reclamation regulations can reasonably be set.

C. POLITICAL AND ECONOMICAL CONSIDERATIONS:

Our Provincial legislators have a recognized responsibility for maintaining an atmosphere conducive to a healthy economy.

A hitherto unrecognized but more important responsibility must be the quality of life of present and future generations.

Strip mine exploration and development, including the necessary new roads, might involve a minimum of the total area of Alberta, but in some instances this will be land with a higher value to residents in its present form.

The U.S. Department of Interior states in its (1968) publication, "The Cost of Clean Water" that 'cleaning up acid mine drainage ... will involve several billion dollars.' This statement is significant when we consider the fact that much of the Alberta land with strip mining potential is in our important watershed areas, therefore increased costs for pre-treatment of municipal and industrial water supplies are likely to be considerable.

I have seen no evidence to date that possible benefits from strip mining cannot be exceeded by those derived from other sources.

D. ALTERNATIVES:

A tourist, in the broad sense, is defined as a hunter, fisherman, traveller, either resident or non-resident, conventioner, visitor, etc. Tourism involves all areas of our Province and promotes conservation and preservation, and guards against pollution, when compared to heavy industry. Alberta realized $250,000,000 from tourism in 1970 despite the fact it ranked ninth among the Provinces of Canada in promotion of tourism (Dowling, 1971).

Emerging African nations have recognized the advantages of 'clean' industry in establishing national parks. Scotland is buying back, at great expense, tracts of land to be administered by the Scottish National Trust after studies revealed that land, in its original form, returns revenues in excess of those realized from some other types of development (Scottish Field, 1969).

During 1971 the State of Delaware enacted a law banning new heavy industry from its 125 mile coastline. Delaware anticipates continued prosperity due to sound tax laws and the lack of a sales tax, plus a pleasant quality of life (Time, 1971). The Governor of Oregon has publicly invited people to 'visit this beautiful State' but not to 'move in', thus apparently recognizing the benefits of tourism and the problems created by excess permanent population pressures.

Tourism is one of the few stable factors in the Yukon Territory economy (Lotz, 1970), while mining, here as in other areas, waxes and wanes with the vagaries of foreign markets. What will happen when Japan, with its serious air pollution problem, legislates in favour of smokeless fuels?

The beauty of our mountains is proclaimed in official Government brochures, while at the same time we permit or propose operations which would destroy this beauty in the passes which provide people with their first and most important impression of our foothills and mountains. Although less spectacular than the mountains, our prairies, parkland, and northern forest zones deserve equally well planned land use regulations.

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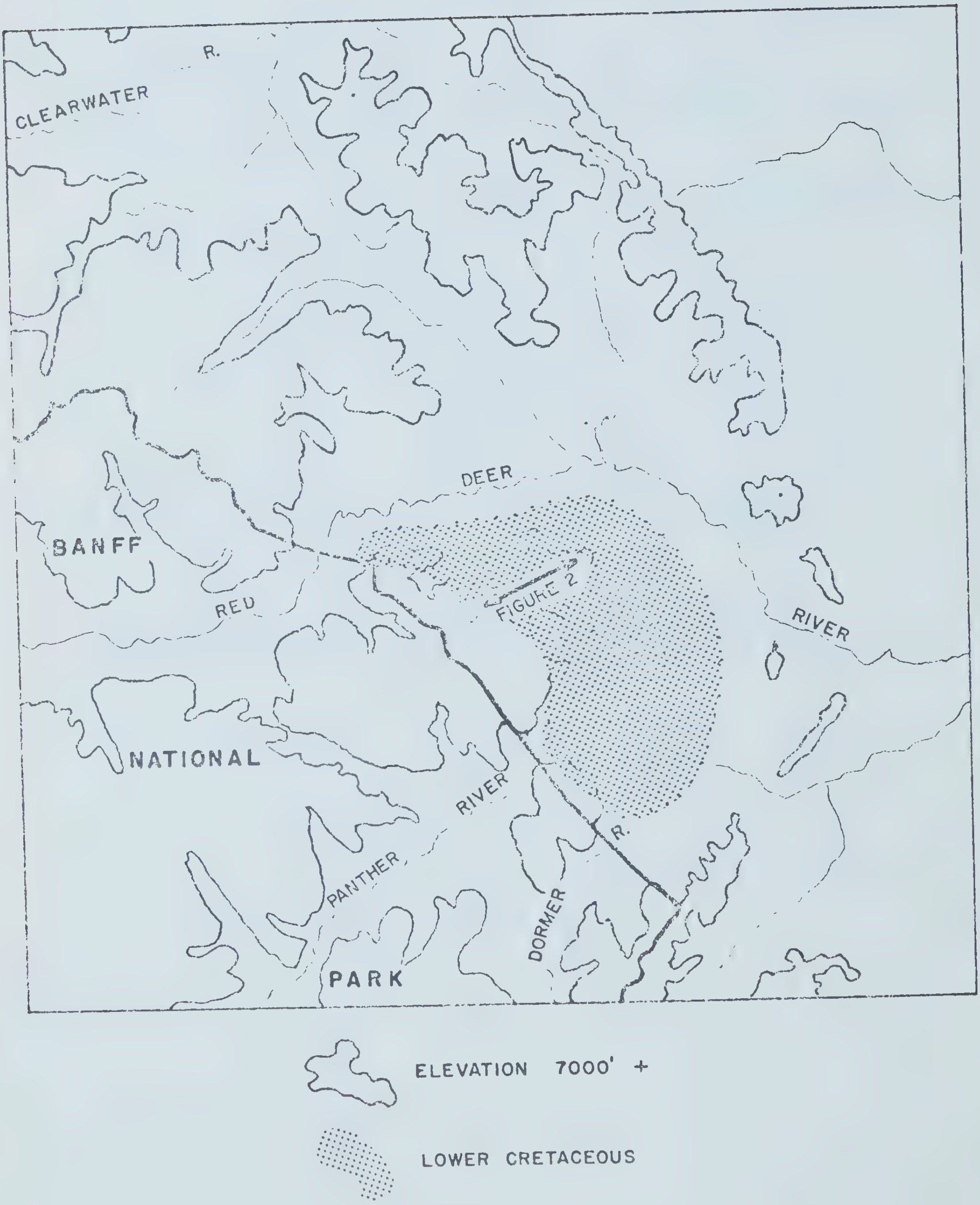
R.
CLEARWATER
DEER
BANFF
RED
FIGURE 2
RIVER
NATIONAL
RIVER
PANTHER
R.
DORMER
PARK
ELEVATION 7000' +
LOWER CRETACEOUS
SCALE 1" = 4 MILES

FIGURE

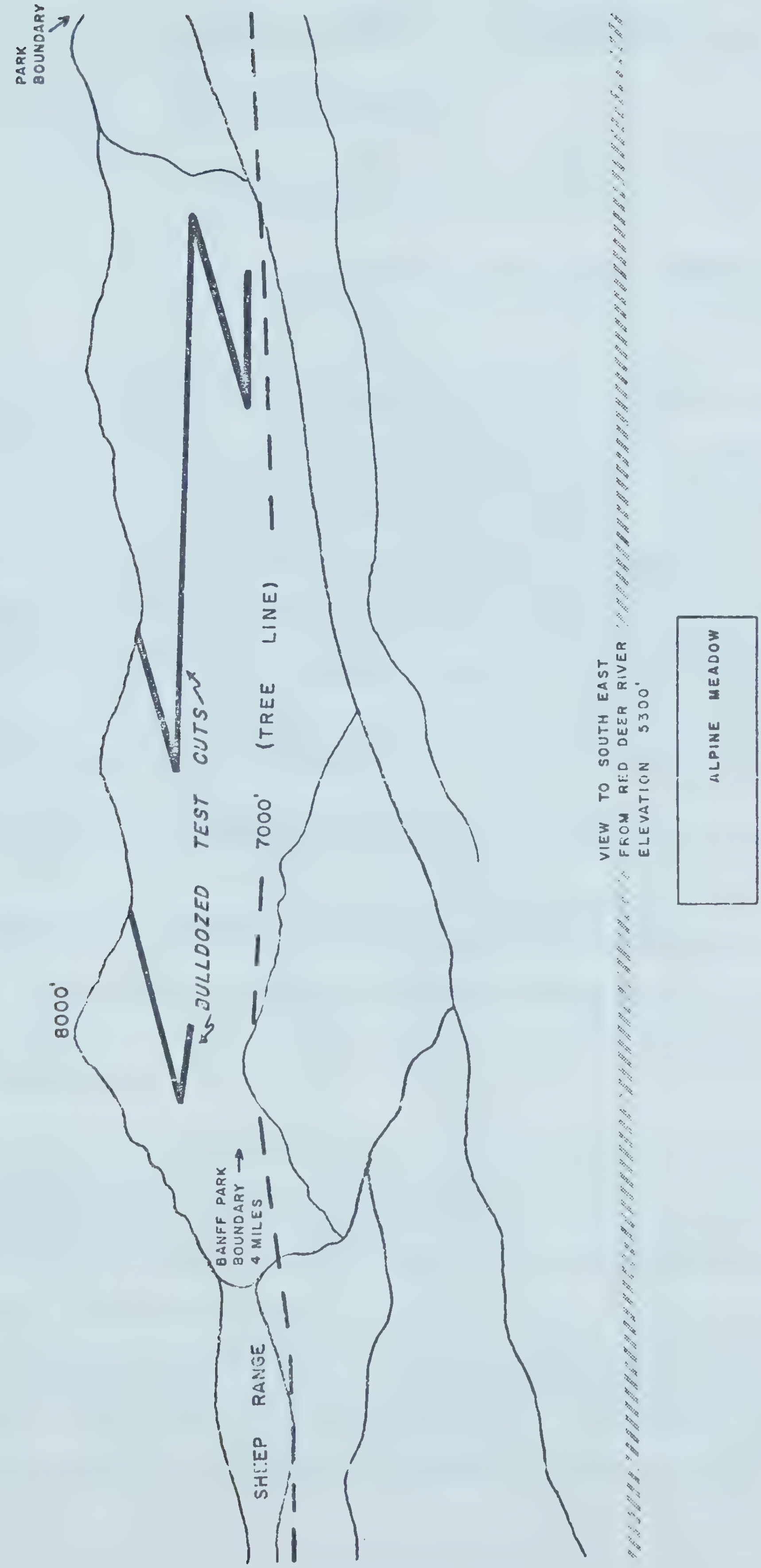
PARK BOUNDARY
8000'
BULLDOZED TEST CUTS
7000' (TREE LINE)
BANFF PARK BOUNDARY 4 MILES
SHEEP RANGE
VIEW TO SOUTH EAST FROM RED DEER RIVER ELEVATION 5300'
ALPINE MEADOW

FIGURE 2

COPY OF LETTER RECEIVED FROM: MR. JIM BURNESS

Lethbridge, Alberta
January 8, 1972

6.15

Environment Conservation Authority,

Dear Sirs,

Since I was not able to appear before your public hearing in Lethbridge, I would like to present a few thoughts by letter.

Experience and observation makes it apparent that the biggest problem is the enforcing of any reclamation program. Since the profits of mining have been extracted at this point, any work on reclamation will be a lessening of these profits. We all know how difficult it is to get a person or group to do something where there is no incentive. Thus any enforced reclamation will be a headache for the Government or overseeing agency if this reclamation is left to the last. Every loop hole and delaying tactic will be used.

So if this type of mining is allowed the reclamation program should be written into the contract as a continuing program to be carried out either continuously or in well defined stages. Also the streams below the operation should be closely monitored. Provision should be made in the contract to instal purification facilities where needed so that none of the pollution escapes outside of the mining area.

It would be helpful if the appropriate union was made a part of the enforcement agency. These people have the welfare of people at heart and are not liable to make any deals or be sidetracted from enforcing the rules.

These ideas would apply to any stripping of the earth's surface including tree cutting.

Thank you for giving us the chance to enter these submissions.

Yours truly,

JIM BURNESS,
2010 -5 Avenue South,
Lethbridge, Alberta.

OPY OF A LETTER RECEIVED FROM: MR. R. H. CARLYLE, BLACKFALDS, ALBERTA

6.16

POWER WITHOUT POLLUTION

The present controversy over strip mining in Alberta is part of the problem of conservation and pollution which has become a major issue almost everywhere in the world.

Anti-pollution and conservationists protest the release of harmful gases, the contamination of lakes and streams and the declining fish and wildlife population. Government and industry, on the other hand point to the revenue obtained, the jobs created and the need for an expanding economy.

Unfortunately we cannot have it both ways. If we continue to produce more goods and services for the affluent society we must accept the fact that our environment will continue to suffer. Conversely, if we wish to maintain the environment as it is we must be prepared to lower our so-called standard of living. Perhaps the most sensible course for the present would be a compromise between the two positions. We could continue to enjoy many of the advantages of our modern society, with minimum damage to the environment.

Such a program would entail the re-use or re-cycling of all metal, glass and paper products and the use of non-pollution devices in cars and trucks. It would also necessitate drastic changes in the electrical power industry.

Power companies using fossil fuels advertise electricity as a very clean source of light, power and heat, but nothing is said of the environmental deterioration created by the growing number of such plants. If the present rapidly increasing demand for electrical power continues, it will be necessary to double the generating capacity every seven to ten years.

We are told that energy sources of a less polluting nature will replace fossil fuels in the future. Nuclear plants are already in use and many more of them are being planned. A growing number of scientists are pointing out that there would be serious hazards in the widespread use of nuclear energy as a source of power.

In their book "Poisoned Power" researchers Gofman and Tamplin of Lawrence Radiation Laboratory, Livermore, California, state that "in one year of operation a single large nuclear power plant will generate as much long-persisting radio-active poison as one thousand Heroshima type bombs."

Radiation to be expected from several atomic energy programs burgeoning rapidly is a far, far more serious hazard to humans than any of the so called experts had thought possible.

"The hazard to this generation of humans from cancer and leukemia as a result of atomic radiation is twenty times as great as had been thought previously. The hazard to all future generations in the form of genetic damage and deaths had been under estimated even more seriously."

Gofman and Tamplin point out that more money for research in the nuclear power field could result in a process comparatively free of radiation. They deplore the fact that United States utility companies spent three hundred and twenty million dollars on advertising (in 1969) to increase consumption and only forty million dollars on research to develop better means of generating it. More money should be spent studying other methods of developing electrical power such as geothermal steam, solar energy tides, etc. Despite increased demands, there appears to be growing opposition to power plants using strip mined coal, as well as to further hydro-electric projects. A partial solution to this dilemma would be a campaign to cut the use of electricity to a minimum.

Power consumption could be reduced without causing any great inconvenience to the average consumer. The number of street lights could be decreased and the time they are lit shortened. Flood lighting of buildings, used car lots, etc. is unnecessary. Farm yards could also do without all night lighting.

Block heaters in motor vehicles consume a large amount of electricity. A well insulated garage and tight doors will keep a car sufficiently warm overnight without additional heat.

We are building more and more covered rinks with artificial ice plant which are heavy users of electricity. Then there must be electric heaters overhead to keep the spectators comfortable. We will soon be building electrically heated stadium to accommodate summer games in cold weather as well as these expensive installations to provide winter sports facilities in warm weather.

Industries use considerably more power than do homes and offices, and here again there is a tremendous waste of electrical energy. To reclaim steel from scrap takes only one quarter of the energy required to produce it from ore.

Aluminum production requires a tremendous amount of electrical power. Here too, recycling would conserve a great deal of energy.

Nitrate fertilizer production is another heavy industrial user of electricity. Nitrates required for growth of cereal crops could be provided in part at least, by a rotation using legume crops and also by better use of animal manure.

Those who are constantly urging maximum resource development point to the employment such a policy creates. Many more jobs would be provided however if raw materials were turned into finished products here rather than sending resources to other countries.

Power companies, like other industrial enterprises, operate solely for the purpose of obtaining the greatest possible financial return. Efficiency has been the guiding motive in achieving this objective, but ecological and environmental problems now and in the future will force us to adapt a new set of values. We can no longer allow our natural resources to be exploited for the profit motive alone. No matter how efficient our production methods by present standards they must not be tolerated if no consideration is given to the damage done to the environment.

A situation of this kind offers an excellent case of public ownership of an industry. There would no longer be the same urge to expand for the sake of more profit and much more attention would be paid to operating under the best conservation practices.

Unfortunately public ownership of power in the past has been something of a political issue in Alberta. Reason too often has been swept away and a free enterprise versus Socialism controversy has developed. It could be pointed out however, that eight provinces in Canada have publicly owned power corporations which were set up by governments representing four different political parties.

As an incentive to lower power consumption Gofman and Tamplin suggest that "the rate structure could be reversed so that the more electricity you use, the more it costs you." As present the more electricity you use the less it costs per kilowatt hour. Obviously, if we have a power problem, we should not reward people for using more electricity and punish the little person because he uses less. Here again, such a policy would only be feasible under public ownership.

An extensive research program to develope pollution free power is urgently needed. This could be financed by money formerly used for advertising purposes.

It is encouraging to note that a move for a saner approach to the power problem has been made in the United States. An article "Heresy in Power" appearing in Time Magazine, December 28th, 1970 states "In 1967 when Charles Luce became Chairman of Consolidated Edson Company he yearned to boost consumption (of electricity) and did. But last week he told a startled Manhattan audience: "The wisdom of three years ago is the idiocy of today."

Instead of trying to increase consumption he now wants to decrease it.

Conservationists in New York have won assorted court orders delaying the company's proposed new plants. They argue that power generation also generates pollution and now Luce has publicly agreed with them.

In Alberta we still have undeveloped water power and large reserves of fossil fuels. We can continue to allow power companies to exploit these resources for a substantial profit, to encourage the waste of a considerable part of the electricity, and to disregard proper conservation procedures; or we can do as other provinces have done and bring the development of these resources under public ownership and control. Strictest conservation measures can then be used, more research carried out, and the unnecessary use of electricity greatly reduced. A much larger share of our natural resources could thus be preserved for future generations.

6.17 STRIP MINING IN THE PROVINCE OF ALBERTA

Presented by: R. F. Mountain

In many parts of Alberta where the land is reasonably level, large deposits of high quality coal can be strip mined with little damage to the environment. In these places reclamation can easily be carried out to provide recreational facilities for boating, fishing, and winter sports.

In some mountainous areas of the Province where large deposits of high quality coal are found, strip mining is so detrimental to the environment that it should not be carried out at all.

If our government allows the companies to strip mine in these areas I think a large sum of money should be paid to the Alberta government, before any excavating is started, as insurance that a pre-arranged reclamation program be carried out.

In some countries, after coal is strip mined, the entire reclamation program is paid for by the excavating company. I feel that in the province of Alberta, where the provincial treasurer is receiving only 10¢ per ton in royalties, for the coal, a similar program would be appropriate.

6.18

COPY OF LETTER RECEIVED FROM F. C. MARFLEET

This is an appeal from me to exhort you to use your power and influence to arrest the impending ruination of that part of Alberta which is known as the Alberta Forest Reserve.

May I first be permitted to tell you why I am as well qualified to do this as any. In 1903 my Grandfather and his family, including my Father, came to Alberta to homestead in the Marwayne district, where they were among the first pioneers. I was born there almost fifty-seven years ago and completed my high school in Marwayne. I then went to Camrose Normal School and taught school for seven years before joining the R. C. A. F. Afterwards, I attended the University of Alberta where I obtained my M.Sc. in biology, specializing in wildlife management. After this, I worked with the Fisheries branch for a bit over a year and then returned to teaching at Sundre twenty years ago last September. I am a native Albertan; a trained biologist, and have chosen to reside in this town which is right next to the forest reserve, because I love and enjoy the recreation the reserve so bountifully provides.

I am and have been for many years past, well aware of the immense variation of flora and fauna within our boundaries and have always rejoiced that our government did reserve an area for our province for our enjoyment and pleasure and recreation. I believe that we can not do less than continue to reserve this same area, in the same spirit that it was originally reserved, so that our successors may inherit these same pleasures and enjoyments. I also believe that we should do this at any cost, for the aesthetic value of the natural flora and fauna is worth it; and once this natural order is disturbed it can not ever be restored. We have ample proof that this is so when we observe the many projects of restoration which man has tried in other regions of the world.

There are those among us who believe that because a part of this reserve contains inanimate products which can be sold to others that the sacrifice of our natural heritage is worth it. I have not met any of these who believe we can have both, they all believe it is a circumstance of either one or the other. Surely they have not the proper right to render this decision, one which will deprive our future forever for a gain in present wealth (no matter how great).

I am specifically disturbed about two aspects of industrial development either of which will result in unrestorable destruction of our biome. One is the installation of factories for refining of oil and it's byproducts within the boundaries of the reserve. The effluents from these are extremely noxious and cannot be completely controlled. Modern technology permits the transmission of all such products by pipeline over great distances, so I would urge that consideration be given to transmission of the raw products to factories situated beyond the boundaries of the reserve as the only permissable solution to the problem of extracting oil here.

The second item is the threat of proposed strip mining of coal in our foothills. In this instance I am only acquainted with those foothills situated on the Red Deer river drainage. Here the area which has been extensively explored for the purpose of strip mining coal is coincidental with the breeding grounds of the Rocky Mountain Bighorn Sheep. Should this strip mining become a reality it can only mean the extinction of these animals in this locale, because Sir, despite arguments to the contrary, there is no place for them to further retreat. There also has been proposed that these mined locations will be reclaimed and indeed, I believe that legislation is now in effect to guarantee that this will be done. But I question the efficiency of the reclamation in these areas. The natural browse now being utilized consists mostly of sedges. I cannot believe that at this high altitude a reclamation even remotely resembling this is possible. So here we quite surely have an either/or problem. I implore you to decide in favor of the sheep.

In addition, I also believe that the pressures being now exerted by private interest to further exploit our public reserves for their own advantage will increase hourly. The time to arrest or stop this pressure is NOW. When I compare the condition of our forest reserve today with the condition as I first knew it some twenty five years ago, I can not help but have great fear about what its condition will be twenty five years hence. If present trends continue it will nearly all be gone by then. We may be a bit richer as far as money goes but we will be doomed to tolerate artificial conditions in our recreational areas such as we now find in most of the United States and in many other parts of Canada. I can not believe that it is worth it.

I could continue with arguments, and cite many examples to substantiate my belief. I know the time has arrived to arrest this despoliation. If I can contribute in any way to help to stop it, I am hereby offering my services. I will be happy to do so. I beg you Sir, to please hear my plea.

6.19

WRITTEN BRIEF

TO BE PRESENTED TO THE COMMITTEE ON ENVIRONMENTAL STUDY ON STRIP MINING IN ALBERTA

PREPARED BY: MR. TYMEN HOFFMAN

The Rocky Mountain House Chamber of Commerce respectfully calls the attention of the Honorable Minister of the Environment and Dr. W. R. Trost, Chairman, Environment Conservation Authority, to the following reasons why we oppose the strip mining proposed in the foothills of the Eastern Rockies and Rocky Mountains themselves.

First, with the increased demand for recreational areas in Alberta by the people of Canada and the rest of the world, are we about to embark on a program which will result in us destroying the most valuable recreation area in our province, excluding the National Parks? Does destroying the beauty of our area for the sake of obtaining approximately $62,000 worth of coal per acre[1] outweigh the long term investment as a recreational area for tourists? We have grave doubts, especially since tourism is one of Alberta's largest sources of income.

Second, we are given to believe from all sources of environmental control that our most precious possession is a supply of fresh, clean water, and it is considered as one of the most valuable resources by all sections of society. Can our government in Alberta stand around and argue that we are not affecting this valuable resource by proposed strip mining from the foothills in the Crowsnest Pass to the Hinton area? All the the streams running east of the Rockies pass through this coal bearing belt.

All one has to do is proceed into the Crowsnest Pass region of Alberta, to the now famous or infamous Vicory Creek, one of the best fishing streams in Canada at one time, now devoid of all fish or wildlife, running brown with silt and undoubtedly deadly acids.

If we may quote from the National Geographic Magazine, December 2, 1970, page 776:

> "Strip Mines Ravage the Land"
>
> ....This mode of extraction has brought devastation to parts of Kentucky, West Virginia, Pennsylvania, Ohio and other mining states. Mountains are decapitated, farmlands gutted, wildlife habitats destroyed. Erosion runs wild through the denuded landscapes, choking streams with silt; rains and seepage add deadly acids...."

The article continues to point out with pictures how water seeping through abandoned pits and underground mines picks up sulphuric acid. "Isaacs Creek was turned orange by iron hydroxide, another mining pollutant."

Vicory Creek in the Crowsnest Pass is at present in this condition. Settling boxes were installed in this creek, but even this has not been successful in stopping the acids and other pollutants from flowing into the major rivers in the south, especially in spring run off.

Another instance in the exploration of the area in Alberta is the Pasque Mountain, in which Bralorne Can Fer Resources Limited was ordered to clean up or shut down. (Calgary Herald, Saturday, September 4, 1971.)

Are we going to be like the ostrich and stick our head in the sand and say "nothing doing" and do nothing?

We are not willing to accept this problem, after seeing the results of the strip mining in the United States, and what their thoughts are today on strip mining, namely "avoid at all costs." Are we going to allow this to happen in our area? Let us use some common sense. United States has the sad legacy of strip mines. Why be a follower? Can Alberta not lead the way and can we not learn from others' wrong doings?

The thought "we can reclaim the land and have sufficient provision made and governed by law to reclaim the land" is sad. The amount set aside in dollars and cents at present by coal companies in Alberta for reclaiming, is hardly sufficient to replace the overburden, let alone replant trees or reseed the area. Even if this is done, the first year, what happens after five years when much of the growth has died away. It then becomes a cost to the taxpayer.

Where does the pollution of streams from this condition stop? Is this progress?

At present we are experiencing water shortages in our major Alberta cities. The Saskatchewan River is at its lowest level in years, and Edmonton looks to the West for its supply of good, fresh water. Once past Edmonton, Fort Saskatchewan enjoys the pollutants of Edmonton, partly because of the low river level. This polluted water flows directly to Prince Alberta and beyond. Are we thus going to say that we will not disturb sufficient area to hurt our watershed? Any destruction to the watershed is critical because it adds pollution. Let us now call a moratorium on strip mining in our area, at least until guarantees can be assured that pollution will be prevented.

Before any strip mining is done, why does our government in power not have a cost benefit study, not just for a one year period, but for a long term period.

Does the ten cents a long ton paid to Alberta government for the coal at present offset the subsidy of 60-70¢ a ton for shipping?

Third, the number of jobs provided by opening strip mines are relatively few. Especially with the large automatic equipment of today.

Who is really making the money on the coal? Certainly not Albertans. Once the money leaves our area, it is difficult to recover any of the benefits that dollar may have provided.

Fourth, from the point of view of a conservationist, the areas set aside are the habitat of elk, sheep and in some instances even goats and grizzlies. Mining these regions would certainly affect their grazing areas, and with the increased pressure of hunting on these animals, why not keep some of these areas inaccessible and available for grazing areas.

At present the grizzly is in a serious position. Can we not leave his remaining area untouched?

Returning to the article quoted formerly from the National Geographic Magazine, in Kentucky, 10,000 miles of streams and rivers were polluted with acids and other pollutants and are thus unfit for life, or human consumption. Man cannot rectify this problem; only nature can, and this may take centuries, if they can be restored at all.

We therefore recommend careful planning and strict laws before any strip mining is done.

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[1] Statement made by Mr. A. F. Collins, Vice-President of Alberta Coal Limited, Calgary Herald, Wednesday, December 11, 1968.

6.20 SUNDRE AND DISTRICT CHAMBER OF COMMERCE

Presented by: O. A. Procyshen

At a special meeting of the Sundre and District Chamber of Commerce held January 4, 1972, the matter of coal mine development in the Panther River area was discussed thoroughly from all aspects.

This area along the Eastern slope of the Rocky Mountains lies in a south-westerly direction about 60 miles from the town of Sundre. Any jeopardy to its unsurpassed scenic beauty, its natural wildlife, and its availability to the people of this district as well as the many tourists who visit here each year is a matter of grave concern to us. We wish to go on record as being unanimously opposed to its further distruction by industry.

This wilderness country has already been disturbed and marred in the name of the economic life of our country by the oil industry. Where at one time four active outfits of guides and outfitters were not enough to handle the influx of hunters who came from all parts of the world to hunt big game and to bring out trophy animals that made Boone and Crockett records; at present not one of these outfits is operating. The life habits of the wild game have been disturbed and these animals do not have the opportunity to live and mature in their natural habitat. Now coal prospecting, under the guise of economics and progress is riding roughshod over the area and it can only result in the final annihilation of the big game of our west country.

The Ya Ha Tinda is an attraction that draws many people. In essence it is actually one of the wonders of nature in Alberta. Named the Ya Ha Tinda by the mountain Cree people it means Little Prairie in the mountains. This is exactly what it is; a piece of true prairie country with the bushes, grass and flowers found only on the prairie and its plant life is absolutely foreign to the flora and fauna of mountain terrain surrounding it. This little prairie, ringed by mountains, is bisected by the Big Horn, a small river, that pours over a fifty foot ledge to create a falls and beauty - not easily found anywhere else along the eastern slopes. Standing in the meadows of the little prairie near the ranch buildings, scars of the march of coal prospecting can already be seen along the sides of the mountains. The Ya Ha Tinda, unique in its natural wonder, is soon to be despoiled in the endless search for more money.

We feel strongly that this area should be left as it is now, without further encroachment, either by industry or private concern, and that it be preserved in its present state to be there and available for all time to every Canadian and to our future generations so that they can see and enjoy its natural beauty.

PATRON
Hon. Dr. J.W. Grant MacEwan

HONORARY MEMBERS
Dr. J. Dewey Soper
Dr. Kerry Wood

CORPORATE MEMBERS
Alberta Natural History Society
Bow Valley Naturalists
Calgary Field Naturalists' Society
Edmonton Bird Club
Edmonton Natural History Club
Lethbridge Natural History Society

Box 308, Spruce Grove, Alberta

6.21 A BRIEF PRESENTED TO THE ENVIRONMENT CONSERVATION AUTHORITY

on

THE ENVIRONMENTAL IMPACT OF SURFACE MINING IN ALBERTA

1. The FEDERATION OF ALBERTA NATURALISTS represents six member groups, about 200 individual and many members of the member groups, representing in total nearly 1000 individuals. Its officers include professional geologists and biologists, with experience of surface mining in Alberta and Europe. Its objects are summarised on the attached brochure.
2. FAN's interest in surface mining is two-fold. Firstly, mining should not be allowed to damage unique areas. Secondly, damage should be minimised by appropriate conduct and reclamation. Conservation, the wise use of resources, will on balance favour strip mining in some areas, and not in others. This brief concentrates on the broad principles which should govern surface mining in Alberta.
3. Alberta has two kinds or non-renewable resources, which once removed can never be replaced. First, its minerals (including coal) , which have been heavily exploited. The second are the unique combinations of landscapesand their living inhabitants which give Alberta its special character. Exploitation of these two non-renewable resources are not compatible in the same area, and it is essential, therefore, to recognise and safeguard the areas needed to preserve adequate samples of that landscape and its living inhabitants. Our system of National and Provincial parks, and other protected areas, give some protection to many significant features. Some are, however, not protected, and there is no coherent plan for recognising and protecting such features. In designating areas for preservation, a safety margin is necessary. Mistakes made now can never be corrected.

   Recommendation A That the province should develop a comprehensive plan for recognising, protecting and maintaining adequate samples of our natural environment in Alberta. Such areas should be excluded from all commercial development.
4. This should have been done many years ago. While such a plan is developed, the bulldozers are ripping areas that are perhaps unique. As a matter of urgency therefore, a biological and geolgical survey should be undertaken by the Government of areas about to be mined. The biological survey should not concentrate on the few species people enjoy hunting, but on all the ecological features of the area. Any areas potentially important should be reserved from destruction pending fuller analysis of the need to preserve them, and the companies offered alternatives.

   Recommendation B That the Government undertakes, as a matter of urgency, geographical and biological surveys of areas to be mined in the next few years, and reserves from mining by whatever means necessary any of potentially great importance as natural areas, at least until an adequate evaluation of their significance can be made.

5. All other areas considered for development should be similarly surveyed, at the cost of the lessee, by an independent team of biologists, geologists, and engineers. These would identify the unique features of the site, indicate the best use after mining, and reserve from mining any areas that cannot be properly reclaimed. Within these recommendations, the company can then prepare a development and reclamation plan,(including timing), to be approved by the Government before mining commences. These plans should be available to the public.

   Recommendation C All areas to be mined should be adequately surveyed in advance, and mining undertaken only where a satisfactory management and reclamation plan has been presented.

6. The actual conduct of mining operations should be within reasonable standards set and enforced by the Government, to minimise environmental damage. Variation in standards may be necessary between different types of topography, but the standards should as far as possible be uniform, and public. Reclamation should proceed according to the approved plan (as far as possible during operations. All companies should be required to post a bond equivalent to the cost of restoration, so that if restoration is not completed within a reasonable time it can be undertaken at no cost to the tax payer. Failure to maintain standards should be adequately penalized, by fines or closing down the operation.

   Recommendation D Mining operations should be conducted according to the approved plan, and bonds posted adequate to ensure reclamation.

7. Reclamation plans of individual operations and wider areas should be such as to provide variety of future use of the land. Some may be appropriately returned to agriculture or forest, and some modified to provide for various types of recreation. Thus, the provision of lakes, ski slopes and other recreational facilities may all be appropriate parts of reclamation plans in different areas. Only native species from the area should be utilised in replanting, unless others for a particular purpose are approved in the plan.

   Recommendation E Reclamation should provide for maximum diversity and utility of the areas mined, compatible with the original character of the area.

8. Abandoned mines, in which the public interest has not been adequately protected, should be reclaimed, if necessary by the government. A plan will need to be drawn up, and undertaken in phases. Where adjacent to current or future workings, mining companies may be able to undertake their reclamation in exchange for appropriate compensation.

   Recommendation F That the Government should plan for reclamation of existing abandoned mines.

9. Implementaion of these recommendations depends on Government control. Democracy demands that the effectiveness of Government control can be judged by the citizens whom they represent. Therefore, secrecy in future operations is inappropriate. All management and reclamation plans should be available to the public, and public participation in development of broad priorities for subsequent use should be sought. A small committee of independent citizens, perhaps reporting to the ECA, should be established as a check to the effectiveness of the procedures.

   Recommendation G Public participation in the development and supervision of mining reclamation should be encouraged.

0. Although this organisation does not feel qualified to comment on the economic advantages of surface mining to Alberta as presently conducted, there is a widespread feeling that the low royalties and small employment arising from this industry do not justify the great damage caused. Independent economic advice, probably from outside any of the countries directly concerned, would either allay this public concern or point the way towards more advantageous use of this resource for the benefit of the citizens of Alberta and Canada.

Recommendation H An independent economic assessment of the value of surface mining to Alberta should be sought and published.

David A.E.Spalding
(President)
11.2.1972

THE IMPACT
ON THE ENVIRONMENT
OF SURFACE MINING
IN ALBERTA

APPENDIX A

ENVIRONMENT CONSERVATION
AUTHORITY

A PROSPECTUS FOR PUBLIC HEARINGS:

THE ENVIRONMENTAL IMPACT OF SURFACE MINING IN ALBERTA

Grande Prairie, Alberta,	December 13, 1971
Lethbridge, Alberta	December 15, 1971
Edmonton, Alberta	December 17, 1971
Calgary, Alberta	December 21, 1971

ENVIRONMENT CONSERVATION AUTHORITY

ENVIRONMENT CONSERVATION AUTHORITY
PROSPECTUS ON
THE ENVIRONMENTAL IMPACT OF SURFACE MINING IN ALBERTA

round.

Coal has been mined in Alberta since 1835 and developed to a peak production of 12.5 million tons per year in 1948 and 1949. With the development of Petroleum and Natural Gas in Western Canada and the dieselization of the railroads there followed a lengthy period of decline and relative inactivity. The industry is now experiencing a marked revival. World-wide demand for high quality coking coal together with local requirements for fuel for electrical generation has resulted in renewed development of a number of coal deposits within the Province.

The projected industrial growth of Japan plus an imminent shortage of coal in Europe indicates that coal mining in Alberta will continue to expand. Since a major portion of it will be by open pit or surface mining techniques, the Province can expect to see a continuing increase in strip-mining over the next several years.

No one will deny the economic benefits that can result from increased industrial activities of this kind and it is doubtful whether anyone would seriously recommend that all strip-mining activities cease. However, the examples of serious environmental problems that accompanied surface mining in such places as the Appalachian region of the United States have given us warning, and Albertans do not wish to see them repeated here. Alberta is fortunate in being able to draw from these experiences while its own industry is at an early stage of development.

This period of expansion however, comes at a time of increased public awareness of the environmental consequences of such activities. Present-day mining operations, in addition, are conducted on a far more massive scale and the visible effects appear more suddenly. They are therefore more easily noticed by the public, and strip mining has now become a subject of great concern and controversy within the Province. This concern has now been expressed in a number of letters from individuals and groups to the Environment Conservation Authority.

The Alberta Government attaches considerable importance to these matters, and the Cabinet has requested the Environment Conservation Authority to consider the impact on the environment of oil, gas, coal, and forestry resource developments within the Province. Through the Minister of the Environment, it has now indicated that it wishes the Authority to direct its attention without delay, to the subject of strip mining for coal in order to ensure that permanent environmental damage will not result from these activities.

The Members of the Authority have visited a number of coal mining areas in the Province and elsewhere, and have come to recognize the diversity of environmental interactions which can arise when strip mining is performed in the separate geographical areas represented by:

a) The plains
b) The foothills
c) The mountains

The Authority will now seek, by means of public hearings, to obtain wide public participation in exploring the problems peculiar to each and all of these areas.

Coal in Alberta.

In 1962, 2.1 million tons of coal were produced in Alberta and by 1968 this figure had increased to 3.9 million tons. By 1980 the Province is expected to be using 10 million tons of coal for power generation alone. In 1969, 1.5 million tons was exported and a period of major expansion was underway which saw exports of coal rise to 6.3 million tons in the present year and a projected 15 million for 1972.

The development of automated unit trains for the cheap and efficient transportation of coal could open up enormous markets in Eastern Canada for Alberta coal and facilitate the entry of Alberta "Chars" into the non-ferrous metallurgical industry on the United States Pacific seaboard.

Canada's total reserves of coal are estimated to be 94 billion tons, of which 95% resides in the three Western Provinces. Alberta alone accounts for 51% of these reserves which makes it potentially the most important coal producing area in the country. One quarter of these coal reserves however, representing the only large scale low and medium volatile coking coal reserves in America west of the Mississippi, lie in the environmentally sensitive foothills region to which many Albertans look for their outdoor recreational and aesthetic experiences.

In the plains areas of the Province, the deposits are mainly of the sub-bitumenous type. Some anthracite exists in the Highwood area west of Calgary, but this is not being worked commercially at present.

It is estimated that over the next twenty years, 32,000 acres will be strip-mined between the Crows Nest Pass and the Smoky River. Whilst this represents only 0.02% of Alberta's land area, it will be very highly concentrated geographically and the nature of the disturbance could be intensive and far reaching in both its hydrological and aesthetic effects. In addition, there will be similar but less intensive effects from such associated activities as road, rail and townsite construction, stream diversions etc.

The extent and cost of these effects can be surmised, and the general public in Alberta will be weighing these against the benefits they expect to derive from the removal and sale of the coal. The future of the industry will, undoubtedly, depend in large measure on the extent to which environmental damage can be controlled and the effectiveness of the restoration techniques that might be developed and applied.

Environmental Concerns.

The environmental effects of coal mining in Alberta are most frequently observed in the plains. Where strip mining is conducted in the foothills and the mountains however, people have commented on the mutilation of scenery, the pollution and silting of streams with mine wastes and increased surface run-offs, the increased erosion of top-soils, and the loss of fish and wildlife habitats.

Such effects, they fear, could have immediate and possibly permanent impact on the renewable resources and on the recreational and aesthetic values of the mountain regions. It has been suggested that they may already have caused serious disruptions to the subsurface hydrology of certain areas and that this in turn could endanger the water supply to the Prairies.

There have been demands from some quarters to place restrictions on mining in the Rocky Mountains, and these have taken more marked forms when a popular landmark appears to be in jeopardy. The feeling has been expressed that these areas should be reserved for recreation, aesthetics, and as a heritage for future generations.

To many people, however, the concept of total preservation is unduly idealistic and although it would be the most effective way of preserving the eco-system and avoiding pollution problems, such blanket restrictions are not acceptable to many people for economic reasons.

It is therefore necessary to find a suitable and effective compromise. One suggestion is that strip mining be permitted freely where conditions are favourable to the success of reclamation, but progressively discouraged where they become more difficult or less conducive to success. In such cases other methods might be sought for the extraction of mineral deposits.

The development of realistic, equitable and effective regulations for the control of mining activities is a matter of importance and urgency, and the opinions and concerns of all segments of the public will have direct relevance in determining just what these should be.

Reclamation and Recovery.

Wherever mining operations are conducted, reclamation and recovery procedures have become an integral part of the operations. The extent to which such procedures are adopted, the promptness with which they are performed, and the success that attends them has, however, varied widely from place to place.

Ideally the aim might be to return the land to its former condition in the shortest possible time, but obviously the very fact of the removal of material precludes the complete attainment of this ideal. Legislation and regulations from other provinces and other countries are available for reference, and undoubtedly some of the features of these will be suitable for adoption here.

The Environment Conservation Authority intends, in its present series of public hearings, to provide an opportunity for all concerned, to express their views on this important subject.

It will arrange for the submission of informed statements in the form of briefs by qualified individuals within their specialized areas of competence, and will also request submissions from individuals and firms whose interests are vested within the coal mining industry.

It will be most interested in obtaining representations on all aspects of reclamation and restoration and would expect that comments would be forthcoming on such specifics as the following:-

1. The removal, storage and replacement of overburden and topsoil.
2. The time lapse between opening and closure of trenches.
3. Design of spoil banks and control of erosion.
4. Re-vegetation of spoil banks.
5. Use of contour trenches.
6. Removal of forest cover and handling of debris.
7. Prospecting methods and the use of heavy equipment such as bulldozers for this purpose.
8. Construction and location of roads, trails and campsites.
9. Protection of streams, creeks and rivers.
10. New and improved mining techniques.
11. Planning for reclamation.
12. Transportation and processing of coal.

All concerned groups and individuals as well as the general public are encouraged to attend and make their views known and the Authority intends to contact as many of these as possible with individual requests to participate. The concensus of these public views and sentiments, combined with the informed opinions, will form the basis of recommendations to the Cabinet for new and improved approaches to the environmental effects of strip mining activities in Alberta.

10th November, 1971.

THE IMPACT ON THE ENVIRONMENT OF SURFACE MINING IN ALBERTA

APPENDIX B

ENVIRONMENT CONSERVATION
AUTHORITY

ENVIRONMENT CONSERVATION AUTHORITY

PRINCIPLES UNDERLYING PROPOSED SURFACE RECLAMATION LEGISLATION

The Environment Conservation Authority has been directed by the Government of Alberta to hold public hearings concerning strip mining for coal in Alberta. New surface reclamation legislation will be introduced during the 1972 Spring Session of the Legislature.

The attached document indicates the philosophy, concepts and principles around which legislation on surface reclamation can be developed. The document can be taken as a basis for discussion but does not indicate the final form which the legislation will take, not is it to be construed as Government policy.

This position paper was prepared by a task force of Alberta Government resources personnel for the Minister of the Environment, who has enabled the Authority to make it available to those who intend to participate in the public hearings, as a basis for public discussion. As a result, the Government will have an indication of public response in respect of surface reclamation legislation prior to the Spring Session of the Legislature.

9912 - 107 STREET, EDMONTON, ALBERTA — TELEPHONE 423-2247

THE DEPARTMENT OF THE ENVIRONMENT November 19, 1971

1.0 Introduction

The Alberta Government will introduce new surface reclamation legislation in the 1972 session. This decision is a result of an increasing awareness by the public and the expression of these concerns for the management of their environment to provide a balance between resource development and environmental matters. Although these concerns are generally directed to activities of the energy industry, and specifically surface or strip coal mining, other activities causing surface disturbances are being identified. They include road construction, sand and gravel operations, sanitary land fill and waste burial, agricultural and forest land clearing, water impoundment and conveyancing facilities and a host of others.

In order to provide the general public as well as the various industries and municipal governments the opportunity to express themselves on the type of legislation and the degree of regulation that should control surface disturbances of the environment, the Government has directed the Environment Conservation Authority to hold several public hearings throughout Alberta in mid December. On this basis, the Authority will make recommendations to the Government, reflecting the public's wishes. The Government will take this into consideration in drafting the necessary legislation and regulations.

However, in order that the general public, the various industries and the municipal governments have a common understanding of the philosophy, conceptual framework and principles of the proposed legislation, it is necessary to introduce a draft position statement which can be used as a basis for discussion at the hearings. This statement should not be misconstrued as the final document or even exhaustive in scope, but could provide the central theme on which briefs to be presented at the hearing could be based. Some briefs would provide additional suggestions which would be considered in the recommendations to the Government. It would be hoped that in this manner the public, as well as the resource managers and users would all contribute in the development of the necessary legislation.

2.0 Philosophy of Proposed Surface Disturbance Legislation

2.1 Situation Statement

The domestic and foreign demands for the supply of Alberta's renewable and non-renewable resources will continue to accelerate in the foreseeable future. Population growth, coupled with the need for more job opportunities and energy requirements in an industrializing economy will place a greater stress on the environment in relation to resource exploitations, both in extent of operations as well as intensity of development. The proposed legislation would strike a balance in order that optimum resource development could proceed.

2.2 Emphasis on Prevention of Environmental Damage

This stress on the environment however, can be identified before it is permitted to cause degradation in order that its impact is subsequently minimized. The proposed legislation envisages comprehensive environmental planning before the fact, in order that the emphasis is placed on preventi of damage or the controlled occurrence of damage with the remedial measure known before it occurrs as opposed to remedial measures after the fact.

2.3 Responsibility of Action on Resource User

At present the environmental philosophy appears to place the resource manager or the public in the unfortunate position of proving the nature an extent of damages before the resource user can be held responsible. The proposed legislation would place the responsibility on the resource user to identify the nature and extent of damages and to prove to the satisfact of the resource manager that they would not result in irreparable damage o that necessary corrective action could overcome the damages.

2.4 Compensation Required for Environmental Damages

Many forms of surface disturbance resulting from numerous resource development activities cause irreparable damage to unique features of the environment. The legislation being proposed would require the resource user to bear the financial cost of replacing or recreating alternative features or compensating society in the form of a financial assessment paid to the Government for the irreparable loss of the feature. This is similar to the "polluter must pay" concept. This "cost" may actually be an "investment" resulting in benefits to the industry.

2.5 Privileges as Opposed to Rights

In many aspects, the use and exploitation of resources is considered a perpetual right enjoyed by those holding an interest in them. It is proposed that this is a privilege which can be made conditional, renewed or terminated as the balance between resource development and environmental matters may determine.

2.6 Public Hearings on Environmental Matters

At the present time, few development proposals aside from energy matters are subject to public hearings. The proposed legislation would make it mandatory that specified resource allocation developments of an irreversible nature could require public debate in the Legislature and that other developments would require public hearings to expose the full nature of their environmental impact before action proceeded.

2.7 Delegation of Administrative and Enforcement Responsibilities

The proposed legislation would encourage participatory planning by delegating responsibilities to those departments or administrative agencies of government or municipal governments to ensure the most effective application of the statute and enable the administrative unit with the required expertise and capability nearest to the problem to share in the planning and execution process.

3.0 Conceptual Framework

The proposed legislation is intended to be broad in application to those surface disturbance activities having an impact on land and subsequently on the environment. It is intended that the Act would stipulate the powers and responsibilities of the Government and that regulations pursuant to the Act would apply to the various surface disturbance activities with respect to administratio standards, approvals, enforcement, delegation of powers, etc.

3.1 Definition of Surface Disturbance

It is proposed within the legislation that the term "surface disturbance" would include at least the following three activities:

3.11 the removal and/or exposure of the land surface,

3.12 the removal of vegetation and/or water which results in the exposure of the land surface,

3.13 the covering up of the original land surface with water and/or solid cover

3.2 Geographic Area of Application

3.21 It is proposed that the legislation would apply to all lands situated within the Province subject to The British North America Act and The Alberta Natural Resources Act which may exclude certain lands.

3.22 It is proposed that the legislation would apply to all public lands as well as all patented lands and that the regulations would be applied with equality.

3.3 Consolidation of all Activity Phases and Sequences

The regulations pursuant to the legislation being proposed would include all the various phases of resource development having a surface disturbing impact on the environment, i.e., exploration, development, operation, processing, transportation, storage, servicing, reclamation, abandonment, etc. Often, only one specific activity has been considered, which becomes distorted out of context to the entire sequence. It is intended that a program of activities including the entire series of sequences be regulated in context. In addition, the administration would be interdepartmental to such an extent that unilateral departmental or single disciplinary action could not occur.

3.4 Binding the Crown and its Agencies

The proposed legislation would include actions taken by the Crown as well as its agencies in addition to the actions of others.

4.0 Principles Included in the Proposed Legislation

4.01 Acquisition of Rights

The legislation would provide for the acquisition of rights to the resources in order to guide, control or deny their use and subsequent environmental impact as follows:

4.011 surface title

4.012 surface rights or interest and control of use in them

4.013 subsurface mineral title

4.014 subsurface mineral interest

4.02 Methods of Acquisition

The legislation would prescribe the means of acquisition of these rights and interests including:

4.021 negotiation for exchange

4.022 purchase

4.023 expropriation procedures for surface and subsurface rights

4.03 Arbitration and Appeal to Courts

The legislation would provide for arbitration and appeal to the courts in matters of law with regard to acquisition of rights and interests as well as the implementation of plans and approvals.

4.04 Natural Resources Transfer Agreement

The legislation would provide for the acquisition of mineral interests granted prior to October 1, 1930 by the federal government.

4.05 Compensation by the Crown

The legislation could provide for loss of right or interest in the form of compensation in specific cases where approved by the Lieutenant Governor in Council.

4.06 Application and Approval

The legislation would emphasize a comprehensive environmental planning process including a review of development proposals prior to three specific events in order that environmental matters are considered:

4.061 prior to the proposed sale or renewal by the Crown of a resource disposition in order to predetermine the potential environmental degradation,

4.062 prior to the issue of the necessary exploration permit in order that the terms and conditions for exploration and reclamation are defined,

4.063 prior to the approval to proceed with the resource development in order that all factors of development and reclamation, including subsequent surface land use, are satisfactorily agreed to.

4.07 Reclamation

The legislation would provide that reclamation of disturbed lands would proceed simultaneously with operations in order that the period of disturbance would be limited.

4.08 Regulations

The legislation would provide for specific regulations encompassing various types of surface disturbing activities including petroleum and natural gas operations, coal mining, clay and marl quarrying, sand and gravel excavation, resource road construction, water impoundment and conveyancing facilities, sanitary land fill and waste burial, and land clearing for agricultural and forestry purposes.

4.09 Guidelines

The legislation would provide for approved guidelines by which exploration development and reclamation proposals would be assessed in the planning process.

4.10 Power of the Minister

The legislation would provide for the authority to prohibit, prevent or minimize the following:

4.101 the physical erosion of the land surface,

4.102 the physical, chemical or biological degradation of the land surface,

4.103 the cultural, scenic and aesthetic deterioration of the land surface.

4.11 Retroactive Application

The legislation could provide for a retroactive feature which would place the responsibility for reclamation of previously disturbed land as specified in accordance with the Act, on the surface disturber. The length of the retroactive feature would be specified in the Act.

4.12 Security Deposit

The legislation would provide for the authority to specify by regulation a financial security deposit to ensure satisfactory compliance with the approval for reclamation purposes.

4.13 Forfeiting of Deposit

The legislation would provide for the forfeiting of the security deposit where the reclamation was not undertaken or was not satisfactory.

4.14 Certificate

The legislation would provide for the issuance of a certificate attesting to the satisfactory completion of the reclamation.

4.15 Penalties

The legislation would provide for financial penalties as well as imprisonment for convicted violators of the Act.

4.16 Severability of the Act

The legislation would be severable in the event that a specific section were declared ultra vires by the court.

5.0 Conclusion

This is the proposed content of the legislation. Briefs received during the public hearings as well as many other considerations will all have a bearing on the content of the Bill when it is introduced to the 1972 session of the Legislature.

If you have an interest to express, this is your opportunity to do so.

THE IMPACT
ON THE ENVIRONMENT
OF SURFACE MINING
IN ALBERTA

APPENDIX C

ENVIRONMENT CONSERVATION
AUTHORITY

RECOMMENDATIONS ON SURFACE RECLAMATION LEGISLATION IN ALBERTA

by

The Ad Hoc Committee of the Scientific Advisory Council of the Environment
Conservation Authority, January, 1972

INTRODUCTION

The principles set out for Public Hearings, by the Department of the Environment, around which Alberta's surface reclamation legislation will be developed are commendable. It was stated as an objective in the principles that the "proposed surface reclamation legislation will strike a balance in order that optimim resource development will proceed". It follows from this statement that the proposed legislation must cover two areas.

1. It will describe procedures for determining use(s) to which any land in public ownership will be put. Since mining is just one of many possible uses of land (others may include agriculture, forestry, recreation, watershed conservation, wildlife production), the proposed legislation can be expected to either encourage or prohibit mining (including surface mining) in a particular area, depending on whether such mining would contribute to or detract from the optimim resource development*.

2. The legislation will outline the philosophy and techniques to be employed in subsequent development of any land, public or private, where surface disturbance will result. Exploration, surface mining or other activities which take place should then be done in a way that assures a continuance of optimum resource development. From details of the principles set forth in the Department of the Environment Summary, it would appear that Alberta proposes to employ techniques to insure surface reclamation that will

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* Here it should be recognized that development in the case of certain resources may actually imply no development in the physical sense.

satisfactorily protect the environment.

Our report makes recommendations in both of these areas (ie. I. and 2. above) of legislation. It utilizes information from the Public Hearings on the Environmental Impact of Surface Mining in Alberta, and information obtained elsewhere.

LAND USE DECISIONS

Up to the present there appears to have been little or no serious study or discussion of the alternative uses to which our public lands may be put - as least insofar as mineral development is concerned. It has been the case in the past that mineral and energy resource exploration and development have taken precedence over all other uses of land in Alberta, except in National Parks. Exceptions occured only in those few instances where private individuals, through long ownership, held mineral rights on deeded land. It is imperative that alternative long term development potentials of various areas be assessed in relation to any short run application for mining operations. It must be recognized that mining activity, in spite of stringent reclamation regulations and enforcement, will often preclude future developments of certain kinds. The real cost, then, of the resource exploitation is the long term economic development potential of various forms which is permanently foregone. In many cases the economic value of these potential developments, when discounted to the present at any reasonable rate of interest, generate a present value of opportunity cost which is large in relation to the present value of the external benefits generated by non-renewable resource exploitation. We are aware that the Department of Lands and Forests is currently working on a Land Use Plan for the Foothills Region of the Province. We hope that this Plan and other long term development plans for Alberta's public lands will be put before the public for discussion at the earliest possible date.

It is pertinent at this point to discuss certain aspects of "benefit-cost analyses". In general, the decision rule often used in matters of social policy analysis is that if the benefits of a proposal exceed the associated cost then that proposal is worthy of a favourable consideration. That is, a favourable benefit-cost ratio is a necessary but not sufficient condition for approval and implementation. Other development alternatives may present benefit-cost ratios which are "more favourable". Hence, decision-making criteria should focus on selecting the "best" of a number of "favourable" alternatives.

However, while benefit-cost analysis usually works quite well in policy decisions respecting the internal operations of an economic unit, when it is extended to consider the external costs and benefits generated by economic activity its usefulness (or the interpretation of its results) must become somewhat more constrained. This is because some of the benefits and most of the costs external to the economic unit, but which result directly from its activities, are more difficult to define and measure in quantitative terms. In many cases it is virtually impossible to express the external or social costs of an activity in quantitative, especially monetary, terms. Consequently, when one compares the costs and benefits, including external (or social) benefits and costs, associated with a given activity, the net result will almost always be more imprecise and uncertain than the impression generated by the presentation of a simple benefit-cost ratio. The expression of the results of such analyses in pure numbers often conveys to the uninformed reader a sense of scientific objectivity and precision which is just not warranted in the case of benefit-cost analysis as it is applied in the area of social policy analysis.

In general, the external (social) costs associated with surface disturbance arising from exploration or development of mineral or energy resources are likely to be relatively high compared to the benefits. One should realize though, that in the area of social costs one encounters two important problems: (a) many social costs are highly subjective in that different individuals or groups may agree that something "bad" will happen but attach widely different values (or social costs) to this occurrence, and (b) there are many situations in which a social cost element resulting from some activity may be either zero or extremely large depending upon subsequent events. Here is where a probability calculus must be applied in order to obtain an "expected value" coefficient. It is not difficult to see that in many cases the net result of a benefit-cost analysis will depend almost completely upon whose subjective assessments of certain social costs (and their probabilities of occurrence) are included in the benefit-cost equation.

It is impossible for us to prepare, at this time, a proper benefit-cost analysis of any proposed resource development on the public lands of Alberta. The necessary facts are just not available. However, we will attempt to collate some of the pertinent facts and point out areas that should be considered in the formulation of an "Optimal Resources Use Plan" and in the preparation of a benefit-cost analysis for any resource development proposals either received or initiated by the government prior to the formulation of such a Plan. Much of the information available to us at the present time pertains to the exploration activity and development of surface mining. This should not be interpreted as representing a bias toward or against surface mining; many of the points brought forward will be relevant in considering any resource development on previously undeveloped public lands.

In the case of any resource development the benefit side of the analysis includes revenues accruing to the Provincial Treasury in the form of royalties and taxes. It should also take into account in some way the dividends that flow to stockholders of the resource industry who are Albertans, and the employment created.

Of interest here is the brief presented by the Canada Department of the Environment which discusses the job-creating ability of coal mining (page 6). They state

> "Although employment opportunities are created by the presence of the coal mining industry and its related activities, it is not a labour intensive industry. In 1970, for example, direct employment in the industry constituted less than 1 percent of the total Alberta labour force. Introduction of an employment multiplier to determine the expansion effect does not increase the total numbers employed in other sectors of Alberta's economy significantly. A conservative estimate from several sources suggests a 1:1 ratio of direct to indirect employment within a mining community. The ratio would be slightly greater for the province as a whole."

Even though surface mining activities in the province will create an additional job for everyone employed in mining, it is still doubtful whether this can be asserted to be a direct benefit resulting from surface mining activity. Here we quote from the Slaney report

> "In general, unless the mining company proposes to use workers who would otherwise be unemployed, direct costs of labour and capital will be equal to the payments made to them. The fact that there is a certain level of unemployment at any given time does not mean that the creation of new jobs in surface coal mining is a direct benefit. We must be sure that the surface mine employs people from Alberta who actually would otherwise be unemployed and does not simply attract workers from other areas".

Every form of economic activity has an employment multiplier; and many forms of economic activity have employment multipliers which are larger than those generated by surface mining activity. Also, many forms of economic activity may result in a significantly greater expenditure of funds on domestically (provincially) produced goods and services and lend themselves more readily to the development of a broadly based service and supply sector within the province. In a period of economic expansion, such as we now seem to be entering, it is not at all clear that employment and provincial expenditures provided by surface mining activity will be in excess of those which could be generated by alternative economic activities.

Will control, curtailment, or in some cases, outright prohibition of new surface mining be likely to have significant long term effects on those employed in surface mining activity at the present time? Probably not since the type and degree of skills required by labour in surface mining operations are readily transferable into other forms of economic activity associated with economic expansion, particularly the construction sector. The American experience seems to indicate that the labour of various skills employed in surface mining operations are able to secure alternative employment without great difficulty, although in some cases this may require relocation. It is obvious that the economic and non-economic costs to those displaced by a curtailment or prohibition of surface mining operations are relatively high in the short run. However, in a democratic society with our particular economic institutions, most public policy decisions impose short run costs on the few in order to generate long run benefits for the larger community. Thus, in this particular context, the threat of surface mine operators to "leave the province" if excessive regulations and control are imposed, need not be viewed with particular alarm.

Today, more than ever before, the value of growth for its own sake is being questioned by a large and increasing segment of the populace. It is possible that employment created in Alberta which is filled by a non-Albertan may, contrary to traditional views, be a real cost to Albertans. Again using the mining industry as an example, it should be noted that miners are in very short supply in Alberta and increased mining would certainly cause an increase in immigration. Where the mining is for coal to be used for domestic power consumption, the value of the power to the Province will be taken into account as a benefit. In the case of mining for export however, it may be that no value accrues to the province from the new position, especially if the costs of education of the children, and community, medical, and housing costs are taken into account.

A benefit-cost analysis must note any direct subsidies to the resource developer, such as roads or railroads built and/or maintained with public funds. Other, less obvious subsidies are also made available, some of which could greatly outweigh the benefits received. We are relinquishing a non-renewable resource of great potential value which could possibly be used here one day to the great benefit of the province, or sold at a later date for a realistic price that also includes the social costs. We are, through the Federal Government, allowing what might be termed by some, an overly generous tax depletion allowance on coal, an allowance that has recently been increased! We, not the operators, have been shouldering the environmental costs and risks. Might there not be other forms of economic activity more beneficial to the larger community on which the subsidies could be better spent? In the case of surface mining, as the operators themselves are fond of arguing, the proportion of the total land area of this province directly affected by their activities (disregarding exploration) is very small. Similarly, the number of jobs, extent of local purchases of supplies, materials, and so forth is a relatively small proportion of the total number of jobs and volume of economic activity in the province. It may be that government concessions and subsidies could be more effectively applied in areas of development which bulk more heavily in the economic activities of the province or which have the potential to do so.

A thorough benefit-cost study will take into account that some resource developments are capital intensive; little or none of the machinery may be manufactured in Alberta or even in Canada. For example, the coking coal from the Foothills and Mountains is used elsewhere and the industry which uses it creates no local manufacturing jobs in the province. Morover, mining associated employment here is kept to a minimum wherever possible by introducing enormous earth moving machinery and automated unit trains. The coal is shipped out of Alberta quickly by the shortest and cheapest route possible, having received no processing here other than washing. Nearly all the operations in the Foothills and Mountains are foreign owned, so that dividends leave Canada, as well as Alberta.

Each type of resource development may have certain environmental costs. With regard to coal mining, especially by surface methods, a serious concern is the possible threat to the water supplying capacity of the watersheds of Alberta's cities. Official briefs submitted by the administrations of Lethbridge and Red Deer dwell on this matter. Both cities envisage serious water shortages in the near future and are opposed to surface mining in the drainage basins from which they receive their supplies. Surface mines currently exist in both drainage basins and new ones are proposed. The brief submitted by the Federal Department of the Environment pointed out that surface mining could endanger surface water supplies. Should the livelihoods of Lethbridge, Red Deer or any other community be threatened by a decrease in the quality and/or quantity of its water supply then this is a social cost on which a value may be placed and a probability calculus applied in order to obtain an "expected value" coefficient. In the case of the livelihood of a community the social cost element will of course be very high. It is apparent that if there is a significant probability of occurrence then the expected value associated with that social cost element will also be relatively high. Should the probability assigned to the occurrence of a decrease in the quality or quantity of water be greater than zero, then the resulting expected value will be unacceptable and such activities should be prohibited. Other social cost elements may produce a lower expected value even though the probability assigned to the occurrence is appreciable. Hence "tight regulation" of the development may afford adequate protection if the populace is willing to risk the "costs" associated with failure of the protection.

It should be emphasized here that even in the case of exploration, social costs are generated, especially if the area possesses aesthetic and/or wilderness values.

A great deal of damaging exploration is being done in the Foothills and Mountains of Alberta today by trenching with bulldozer and backhoe, as well as by construction of roads built to bring in equipment. A great deal could be done in initially determining the extent of the coal resources of Alberta in the future by other techniques which do not require surface disruption (i.e. geologica mapping and a geophysical technique called "Induced-Potential"). The potential and reliability of Induced-Potential is just beginning to be realized and techniques for its application greatly improved (see attached letter). It may to a large degree supplant the bulldozer and backhoe in the early phases of coal exploration. Determination of the quality of deposits located by the new technique will still require excavations, but the amount of surface disturbance would be much reduced. History may well show that much of the present damage done in initial exploration was unnecessary and hasty.

It may well be advisable to delay further preliminary exploration in untouched areas until these non-destructive techniques are further refined. In fact, when the available information suggests that new areas of surface mining development in the Foothills and Mountains may be contrary to the public interest, there is little reason for the Government of Alberta to encourage development of these projects with untoward haste.

Other possible costs of resource development include loss of wildlife and fish habitat,* inspection costs, depreciation of land values in the vicinity of the operation, the possibility of diminished tourist revenue both locally and provincially, and in the case of coking coal, the loss by export of a valuable non-renewable resource.

Our mineral and energy resources are crops that can be harvested only once, they are non-renewable. Coal mining in Alberta for example, has had a short history and until very recently was done on a small scale. Much larger mines than now operate here are planned and they can deplete the readily accessible portion of the resource very quickly. Little consideration seems to be given to conserving the coal resource for use at a later date.

Alberta is fortunate in that its Foothills and Mountain coal is of such fine quality. It is ideally suited for coking and steel making. It also is ideally suited for heating, because of its low sulphur content, and thereby low polluting nature. Consequently, there is a tremendous demand to purchase our Foothills and Mountain coal. Demand for this coal will fluctuate over the years, naturally, but it is likely to increase steadily through time. There is now a widespread realization that the amount of fossil hydrocarbon, including coal, is limited, and nearly all of it will be required one day. Our coal reserves are part of the heritage of our children, which we inherited from our fathers. But there are those who say that our coal is wasted and doing its owners no good until it is mined. They are right of course - providing that the owners receive fair value for it. If the owners are nearly giving it way, which they may well be at the present time, then they would be best served by leaving it in the ground.

As we pointed out previously, and as noted in the Slaney Report (p.42), a benefit-cost analysis will not make the decision as to whether social costs and risks are offset by benefits, but will only provide guidance. Once all of the measurable effects have been taken into account, the onus is still with the public administrator to judge whether or not the "benefits" outweigh other "unmeasurable" costs. To the best of our knowledge in no case of energy, mineral, or even natural resource development in Alberta has there been an independent benefit-cost analysis which could provide guidance for intelligent decisions by Government on land use. In the case of mining or forestry operations firms have made their own benefit-cost analyses, but these fail to consider social costs and risks which are charged to the public.

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* It should be recognized that while such loss is often of a temporary nature, in some instances it is permanent and irrevocable changes in wildlife populations result.

Thus, we propose that the Province establish a "Land Use Committee" to be charged with the responsibility of formulating an "Optimal Resource Use Plan" for all public lands under provincial control in Alberta. This formulation should not be made in haste, rather it should be a continuing process. The proposed use(s) should be placed before the public with ample time for debate and input before a final decision is made by the Committee. We recommend that the "Land Use Committee" be made up of highly competent professionals in the following disciplines:

Agronomist(s)
Biologists (Fisheries and Wildlife)
Engineers (Mining, Civil, Soils)
Forest Scientist(Management or Regeneration)
Geographers (Physical and Human)
Hydrologist (Groundwater)
Landscape Architect
Professional Forester (Management)
Recreation Planners (facility and wildland oriented)
Resource Economist(s)
Soil Scientist (Forest)

All, or certain members of the above Committee might be called upon for advice in a specific instance of proposed resource use. All should be called upon for advice in formulating an overall long term "Optimal Resource Use Plan" for public lands under provincial control. It would be expected that members be drawn from both within and outside provincial government agencies.

The Land Use Committee must develop competence in making and evaluating benefit-cost analyses, and such analyses must be made whenever resource exploration or development is proposed for public lands. This benefit-cost analysis should be prepared from the point of view of the province as a whole by an independent body. Indeed, this has also been suggested in the brief submitted to the E.C.A. by the Research Council of Alberta.

Some additional body should be given the responsibility for the application and enforcement of the Optimal Resource Use Plan. This body should be constructed so as to integrate the functions currently dispersed among several Government departments concerned with activities having an environmental impact.

Enforcement could perhaps be accomplished most appropriately through the Provincial Department of the Environment, providing that the question of integrating dispersed responsibility could be resolved.

It is apparent that a large number of Albertans are concerned not just about "reclamation" after resource exploration or development, but are very much concerned about the land-use decisions affecting those lands which are popular for recreational uses such as fishing, hunting and hiking, or possess aesthetic or wilderness attributes. This concern is greatest with regard to the Foothill and Mountain Regions. It is probable that the word "apprehension" best describes the public mood with regard to disposition of these public lands. They recognize that past exploration and development activities have indiscriminately damaged much of the value which they placed on these "wild and scenic lands", and it would not appear that the current emphasis on "reclamation" as opposed to a comprehensive Optimal Resource Use Plan will do much to allay their fears. If we were to attempt to hazard an educated "guess" at what the majority of the people are willing to accept respecting the disposition of their undeveloped Foothill and Mountain lands with regard to the mineral and energy resources, it would probably be as follows:

> "reasonable development carried out with care
> under strict regulation on certain specified
> lands....no development on all other lands."

By accept, we mean "be reasonably satisfied with", and by "reasonable", we mean "able to be reclaimed". For a majority of citizens to be reasonably satisfied with a Optimum Resource Use Plan we think they would have to know that they had some input, or role in developing that plan. That is, they would need to know that their government listened to their opinions during the formative phases of the "Plan".

Acceptance by the government of the premise that any Optimum Resource Use Plan for public lands must involve an input by the general public would be an enlightened decision. It will of course take time, and in the interim the government will be faced with proposals from many groups to "develop" in some way many parts of the Province. Where the government receives proposals concerning exploration or development that will affect lands currently possessing considerable aesthetic, recreational, or wilderness attributes, we would recommend that consideration of the proposal be delayed until it can be seen in the light of all other land use decisions affecting the land in question and neighbouring areas as well (i.e. where does it fit in with the Optimum Resource Use Plan of the province as a whole?). Other interim proposals could be considered by a Land Use Committee similar to the one suggested earlier, the proposals being made public upon their receipt by the government. Public input could be assured via Public Hearings if necessary.

Decisions such as these will not only serve to allay public fears, but will build confidence in the public that their representatives are interested and sensitive to public needs.

RECLAMATION

Private and Public Lands

It is our opinion that regulations governing reclamation of land after surface disturbance should treat private and public lands in the same manner. This is, of course, not the case at the present time.

Reclamation of privately held land in the Province of Alberta is now under the jurisdiction of the Surface Reclamation Act and the Surface Reclamation Council. The Chairman of the Council is also the Deputy Minister of Mines and Minerals and the Act is administered by the Department of Mines and Minerals. In at least one instance in the recent past a District Court Judge has, in open court, termed both the Act and the Council to be, in effect, a joke. Put bluntly, the present Act requires the operator to do little that he does not wish to do.

Reclamation aspects of coal mining on public lands come under several Acts, notably the Mineral Surface Lease Regulations, the Right of Entry Arbitration Act, the Coal Mines Regulation Act, the Forest Protection Regulations, the Public Health Act, and the Department of the Environment Act. Even with this plethora of regulations,proper reclamation is not assured. Moreover, the large number of Acts covering coal mining on public lands is bewildering to the operator. We recommend that one Department be responsible for administration of the new regulations, and that this be the Department of the Environment.

The proposed surface reclamation legislation should cover all environmental aspects of mining regulations. This approach would appear to be endorsed by industry and they undoubtedly will find it more convenient than the present situation. As mentioned above, the new legislation must apply to all land in the province, private and public. Stipulations with regard to protection of the environment should not recognize ownership boundaries. For example, it must be recognized that a landowner does not have the right to destroy the watershed capacity of his land.

We have seen at the recent Hearings that at least one company mining by stripping methods in the Mountains on deeded land is treating the land in an enlightened manner. Canmore Mines Ltd., could have stripped certain steep slope areas under their ownership with profit under the present reclamation regulations. It has chosen not to do so because of great aesthetic damage and the possibility that adequate reclamation would not be possible. The company recognizes that the land is valuable for other uses after mining, notably recreation, and is moving forward with this fact in mind. We should ask that publicly owned lands in the Forest Reserve be treated no less well than this company treats its own lands. This treatment should be accorded to all public lands, accessible or remote.

Legislation

The Environment Conservation Authority made available a summary entitled PRINCIPLES UNDERLYING PROPOSED SURFACE RECLAMATION LEGISLATION, dated Nov. 19, 1971. We are most impressed with this summary, and feel that it should be used, with very minor change, in drafting legislation. Since we agree and support almost the entire summary we will not go through it point by point. However, we will suggest certain changes in item 4.06.

Item 4.06 Application and Approval. This item should be retitled Application and Approval or Rejection, to show clearly that rejection of the application is possible. Furthermore item 4.06 should be modified to read as follows:

> 4.06 The legislation would emphasize a comprehensive environmental planning process in order that optimum resource development could proceed. This will include a review of development proposals prior to three specific events, and the application can be either approved or rejected at any of these three reviews.
>
> 4.061 prior to the proposed sale or renewal by the Crown of a resource disposition in order to predetermine whether the potential environmental degradation should or should not either restrict or preclude surface mining.
>
> 4.062 prior to the issue of the necessary exploration permit in order to determine whether exploration should proceed, and if so, in order to define the terms and conditions for exploration and reclamation.
>
> 4.063 prior to surface mining in order to determine whether such mining should proceed, and if so, to determine that all factors of development and reclamation, including subsequent land use, are satisfactorily agreed to.

A citizens complaint provision should be inserted into the regulation, to allow any citizen with knowledge that the regulation is not being enforced, to compel enforcement, via the courts if necessary. In this connection, it should be recognized that a citizen, as a part owner of public lands, should report abuses of public lands as he would abuses of his own property.

CONCLUSIONS

It is virtually impossible to define meaningful standards which would apply equally well to Prairie strip mines, Foothills strip mines and Mountain strip mines. The principles on which each individual site should be assessed are, however, common. For this reason site planning should rely on the collective judgement of an interdisciplinary regulating body (see earlier discussion re the Land Use Committee) as a more effective means of control than the rote application of regulations.

Legislation and regulations must apply to all lands within Alberta, patented or public, surveyed or unsurveyed, regardless of their geographic location, in order that preventive action be consistent. These regulations must first be preventative, and only secondarily punitive. The following are some of the regulations that we believe should apply in Alberta:

1. Prior to any exploration and/or mining development involving surface disturbance taking place, the operator must file an application containing a detailed exploration, development and reclamation plan (with timetable) with the Land Use Committee. This application should include an "Environmental Impact Statement" prepared by a qualified consultant. The Committee shall make known to the public that exploration or development activities are contemplated and shall receive from the public submissions bearing on the proposal. If deemed to be of public benefit, the government may choose to accept submissions from the public through the use of a Hearing. After reviewing the

operators' proposal and any submissions from the Public, the Committee shall either (a) accept it, (b) accept it with certain modifications, or (c) reject it.

2. The Committee shall be made up of appropriate professionals (see earlier discussion) and each shall certify the part of the application on which his specialty bears.
3. Any departments or bodies required to give approval to exploratory work shall be represented on the Land Use Committee. Approval by the Land Use Committee will guarantee that the work approved can be done, to avoid causing unnecessary delay on the part of the operator.
4. The responsibility of ensuring that the accepted plan is carried out shall be placed on the operator.
5. Reclamation and revegetation should be progressive wherever feasible rather than being delayed until mining has been completed.
6. All spoil piles must be vegetated, and none will be allowed to exceed a final slope of 27° (2:1).
7. The operator shall be required to post a performance bond that will be sufficient (in the view of the Land Use Committee) to reclaim the land if he fails to do so. Upon satisfactory completion of the reclamation plan the performance bond or a portion thereof shall be returned to the operator.
8. Specifications of the kinds and numbers of roads that will be built into mining areas must be provided by the Land Use Committee. It is imperative that roads built for mining projects on public lands follow a road system well designed to meet the needs of long

term management. This may imply either continued maintenance or eventual reclamation to the original natural state.

9. Unless there are good geological reasons, the coal face remaining after mining must be covered by an appropriate thickness of clean dirt fill.
10. Unless there are good geological reasons, the maximum slope of the high wall must be such that it will support vegetation after mining ceases, where vegetation originally existed.
11. No surface mining should be permitted close to a stream, adequate buffers must be left. Wherever feasible, buffers of vegetation for aesthetic purposes should be left.
12. Public Hearings must be held before a decision is made on strip-mining or other resource development involving surface disturbance within sight or sound of a National or Provincial Park, or other areas whose main value stems from their being retained in a "natural" state.

    Where approval is given, every care must be taken to safeguard the values for which the Park was established and is being used.

SUMMARY

The question of alternative uses for public lands in Alberta seems never to have received serious study. In view of the fact that benefit-cost analyses will only provide guidance on the question of whether social costs and risks are offset by benefits, it is proposed that a Land Use Committee be established in Alberta to take responsibility for policy formulation on resource use and development. In addition, there is a need for another body to oversee the application of policy and enforcement of any regulations relating to environmental impact. Both these bodies should be conprised of people drawn from a variety of disciplines, and draw upon both government and non-government personnel.

There is a concern among citizens about the disposition of public lands. The current emphasis on "reclamation" as opposed to a comprehensive Optimal Resource Use Plan will do little to allay their disquiet. In the development of any such plan, there must be room for public involvement and provision for a mechanism by which opinions can be heard and considered.

We believe that regulations concerning reclamation of disturbed land should treat public and private land in a similar manner. Furthermore, in order to reduce confusion and overlap, all regulations pertaining to reclamation should be administered by the Department of the Environment.

Enlightened mining companies are already aware of the potential value of disturbed land for recreational use, following the cessation of mining activity. We should ask that all publicly owned lands be treated no less well than deeded land.

We endorse the document entitled "A Summary of Principles Underlying Proposed Surface Reclamation Legislation", with only minor amendments.

In conclusion, a set of regulations is provided drawn largely from those recommended in the Slaney Report prepared for the Environment Conservation Authority, and also from briefs presented at the Public Hearings.

KENTING EARTH SCIENCES
WESTERN DIVISION

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January 18, 1972.

Professor R. Pharis,
Member, Science Advisory Council,
Department of Biology,
University of Calgary,
CALGARY 44, Alberta.

Dear Professor Pharis:

Re: The Use of Geophysical Methods as a Means of Prospecting for Coal

In the spring of 1971, Induced Polarization (I.P.) techniques were introduced to the coal industry as a means of efficiently prospecting for coal. To date, I.P. has proven to be the only efficient, economic geophysical method suitable for delineating potential coal seams located in the Alberta Foothills.

Basically the I.P. method consists of forcing a current to flow between two metal stakes, which have been hammered into the ground, and measuring the potential field associated with the current flowing through the ground as well as the rate of decay of the potential field when the current is shut off.

A typical I.P. crew consists of four (4) men. One man controls the current, a second records the potential field readings, and two men move the current and potential electrodes.

In general, very little damage is done to the land during an I.P. survey. In most instances, portable equipment, which can be hand-carried, is used. This means that I.P. surveys can, in theory, be completed wherever a man can walk. In practice, it is preferable that I.P. surveys be done along existing seismic lines, bush trails and roads. This minimizes the problems associated with dragging long (up to 7500 feet) cables through "virgin" bush areas. However, crews can work along traverse lines (3 feet by 5 feet wide) from which overhanging branches and bushes (such as tag-alder) have been cleared. In most instances, the only evidence of an I.P. survey having been done is plastic tape on trees and survey stakes for identification of points of measurement.

Induced Polarization surveys in the foothills average between 3,000 feet to 10,000 feet per day depending on ground conditions and depth to and thickness of the coal targets. Their cost averages between $250 and $1,000 per line mile depending on terrain conditions and the size of the coal target relative to depth of burial.

Several coal companies and/or exploration groups have effectively used I.P. surveys to minimize drilling and trenching operations. As interpretation techniques improve, the number of "dry holes" will decrease. At the moment, the percentage of successful holes (i.e. those which contain coal) varies from about 50% to 80% depending on the area and the depth of investigation. I am not aware of any instance where coal has been found at an economic depth (from the strip mining point of view) when I.P. results indicated coal was not present.

As to the use of geophysical techniques for prospecting for coal in the near future, I do not see any other technique becoming competitive with I.P. on the basis of minimum damage to the land surface, reliability of results, and cost per line mile surveyed.

Yours very truly,

J. E. Wyder

J. E. Wyder, Ph.D., P.Eng.
Chief Geophysicist.

JEW:M

THE IMPACT ON THE ENVIRONMENT OF SURFACE MINING IN ALBERTA

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